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BRITISH MUSEUM
8 JUN 31
NATURAL HISTORY.

Lincolnshire Naturalists' Union Transactions.

1930

Edited by
ARTHUR SMITH,
F.L.S., F.E.S.

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Lincolnshire Naturalists' Union.

Founded June 12th, 1893.

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LINCOLNSHIRE NATURALISTS' UNION.

Statement of Account from January 1 to December 31, 1930.

RECEIPTS.	£	s.	d.
Balance in Bank, 1 January 1930	10	2	11
'Transactions' sold	2	12	0
Members' Subscriptions	39	16	0
Bank Interest	0	13	9
	£53	4	8

PAYMENTS.	£	s.	d.
Subscription to 'The Naturalist'	0	15	0
Printer's Account for 'Transactions', Notices of Meetings, Stationery, etc.	24	1	5
Cheque Book	0	2	0
Postages and Small Payments	5	7	9
Balance in Bank, 31 December 1930	22	18	6
	£53	4	8

SEPARATE ACCOUNT.

Life Members' Subscriptions invested in P.O. Savings Bank.

	£	s.	d.
Amount shown on Balance Sheet for 1929	73	7	1
Interest for the year 1929	1	16	6
	£75	3	7

Lincolnshire Naturalists' Union.

Presidential Address

Delivered at Lincoln, December 1930,

BY

E. J. Stream, M.A., F.L.S., F.R.M.S.

LINCOLNSHIRE FRESHWATER ALGAE.

I am afraid I was somewhat rash when in an unguarded moment I consented (largely due to the blandishments of our indefatigable Secretary) to undertake the Presidency of this Union. It has been a great misfortune to me that I have been able to get to so few of the Field Meetings but you will realise that as the Head of a Secondary School of over 700 pupils I have had many calls on my time. The Field Meetings too come at a period of the year when it is particularly difficult for a Head to be away from his school. On several occasions, however, I have been able to obtain from members who were present at the Field Meetings such specimens as they were able to collect and forward to me.

For many years I have been interested in microscopical work in connection with pond life, not so much from the Zoological side as the Botanical. In 1904 when G. S. West published his "Freshwater Algae" I was stimulated to take up the detailed study of the Algae and since that date I have spent many pleasant hours in the study. The work was interrupted by four and a half years of war service. Most of the work has been done in spare time, at week-ends, and during holidays and although somewhat unsystematic I have been able to collect and determine quite a respectable number of

specimens mainly from the northern part of the county.

I make this explanation as a plea for being allowed to give you what I feel to be a somewhat scanty Presidential address. Part I. is an attempt to give a general idea of the Freshwater Algae; while Part II. is a list of such Algae found in Lincolnshire, mainly in the northern part.

PART I.

If one turns up the word Alga in the Oxford Dictionary the following may be read: "Alga Lat. Alga seaweed 1551 Turner's Herbal (1568) 110 Alga '*Whiche is a common name unto a great part of see herbes . . is commonly called in englyshe see wrak*'". While this quotation shows what the original term connoted, to-day the term covers a very much wider field and includes a large number of species found in all kinds of waters, in and on damp soil, and other moist situations. I propose to deal only with Freshwater Algae.

As early as 1724 Ray's 'Synopsis' and again in 1741 Dillenius's 'Historia Muscorum' included a number of Freshwater Algae. From this period onward various writers on Botany made mention of a number of species until in 1809 Dillwyn published his 'British Confervae' which brought together practically all that was known of British Freshwater Algae and which may perhaps be considered as the foundation of their systematic study in England.

During the succeeding years various writers continued to enumerate a number of species in their works on general Botany. In the 'English Flora' 1833 (edited by Sir William Hooker) Dr. W. H. Harvey described the Algae and included 160 species. Later in 1841 he published his 'Manual' and mentioned 198 species. All work in this direction was however eclipsed in 1845 by the publication of Hassall's 'Freshwater Algae'. Smith's 'British Diatomaceae' appeared in 1853 making a great contribution to the study of the diatom which was still further advanced in 1880 by the appearance of Van Heurck's 'Synopsis des Diatomées Belgique'.

So far mention has only been made of what had been

done by English writers. On the continent a large amount of work had been done and important contributions made by Kutzing in 'Tabulae Phycologicae' and Rabenhorst in 'Flora Europaea Algarum', and by Naegeli in 'Gattungen einzelliger Algen'. In America, Wood (1872) published his 'Freshwater Algae of North America', and in 1887 Wolle published his 'Freshwater Algae of the United States'. 1882-4 saw the appearance of Cooke's 'British Freshwater Algae'. During the last part of the 19th century a great amount of work was done on the continent by Bornet, Borzi, Cohn, Chodat, De Bary, Hansgirg, Klebs, Lagerheim, Nordstadt, Wille, Wittrock, Schmidle and others. While in England W. & G. S. West permanently associated their names with the study of British Freshwater Algae.

This somewhat scrappy historical note will serve to show the growth of the study of the Freshwater Algae; and, for reference to present day workers, I cannot do better than refer you to the introduction of that delightful work so ably re-written by Dr. Fritsch—'A Treatise on the British Freshwater Algae'—originally written by G. S. West: a book which I have closely studied and which has been largely used in the preparation of this address.

Having established the fact that the term Alga connotes something more than 'seaweed', let us proceed with the consideration of the Freshwater Algae.

Wherever moisture is there some algal forms will be found. The ocean, the river, the sea, the lake, the pond, the ditch, damp walls, wet rocks, tree trunks, the soil, all furnish their kind. From the pole to the equator they are found, no pool too stagnant, no torrent too swift, no water too cold, no spring too warm to afford them a home. Some float in freedom, others are attached to submerged surfaces whether stone, wood or the stems and leaves of aquatic plants. Some live as endophytes in the bodies of plants or animals, often finding a home in the inter-cellular spaces, while others live in symbiotic relationship with their host as is the case with Lichens. The green cells in the *Hydra*, *Paramecium* and *Ophrydium* are due to

species of *Chlorella*. To sum up the Alga is universal, and this universality must lead us to expect a great variety in size and form. This remark applies not only to Algae generally but to the freshwater species in particular.

The microscopical examination of suitable dippings from ponds and ditches shows thousands of minute unicellular forms; some possessing the power of rapid movement, others more or less permanently still, some solitary, while others group themselves in companies often held together by a mass of gelatinous matter. A walk by the side of a lake, pond or ditch, will reveal masses of bright green filaments, some submerged, some floating on the surface, some branched, some unbranched.

Like all forms of vegetation many of the Algae are seasonal; the spring, the summer, the autumn and even the winter, each have species practically confined to their period. On the other hand there are species which appear to flourish throughout the year.

As might be expected the quiet waters of ponds, lakes and ditches form a suitable habitat for such delicate forms as do also the boggy waters and pools of the moorlands. There are however many forms which prefer moving waters, some live in torrents and waterfalls, while quite a number live in the slow flowing streams. These species are more often than not attached to stones or water plants or the boundaries confining the water, *e.g.* stonework, wooden piles, etc. An examination of the slimy masses usually found on the surfaces of rocks, over which water is constantly flowing or slowly dripping will show quite a number of species. As an ardent microscopist I feel compelled to make reference to the habitat of many microscopical Algae. If the clear waters of a large pond or lake are passed through a net of bolting silk and the residue examined, it will be found to consist of a number of animal and vegetable forms—these constitute plankton. Many of the plant-forms are unicellular, some motile, others free floating, their sp. gr. being very nearly that of the water. They belong mainly to the groups Volvocales, Desmids, Diatoms, Chloro-

coccus, Myxophyceae, etc. A great amount of work has been done in the examination of plankton by G. W. Pearsall and Dr. Millard Griffiths. Around the shores of lakes and ponds the free and attached Algae are sometimes classed as benthic, such forms as *Oedogonium*, *Chaetophora*, *Cladophora*, *Mougeotia*, etc., are characteristic benthic forms.

It is impossible in the time at my disposal and in the confines of this address to give more than a brief outline of common types. I propose now to illustrate and describe a few of the commoner types of Algae.

The simplest form is such as is shown on the first page of the illustrations—*Chlamydomonas* found in ponds, ditches and rain pools. It consists of a simple cell either spherical, ovoid or pyriform with a thin cell wall. Each individual is provided with two cilia, between which there is in many cases a beak, the cilia are generally directed forward during movement. The cell contains a cup-shaped chloroplast. At the anterior end are two characteristic vacuoles just beneath the points of insertion of the cilia. An eye-spot, in contact with the chloroplast, is also another characteristic feature.

On the same page of illustrations is *Pandorina morum*, a spherical coenobium with 16 (or 32) closely packed pyriform cells of the chlamydomonad type with a broader end outwards surrounded by a clear mucous coat. *Gonium pectorale* is a plate like coenobium with 4-16 cells. Another genus, *Sphaerella* is shown—the chloroplast contains bright red haematochrome, particularly in the resting stage.

One of the most beautiful objects seen under the microscope is *Volvox*. The coenobium is a hollow sphere with numerous cells forming a peripheral layer connected by protoplasmic strands. Within the parent cell may be seen the young embryos which often attain a considerable size before they are set free by the breaking up of the parent. *Notomata parasitica*, a rotifer, occurs as a parasite in *Volvox* and feeds on the green cells.

We now pass to a similar but non-motile type, the cells arranged in twos or fours, surrounded by mucilage. The plant

is at first attached but later free-floating; the illustration shows *Tetraspora*, which is easily distinguishable by the arrangement of the cells. *Apiocystis* is in the form of a pear-shaped colony and is found as an epiphyte on the larger green algae. *Pediastrum* is a free floating, flat, plate-like coenobium frequently found in ponds and ditches. The cells are in a single layer and are in 4, 8, 16, 32. These are most frequently arranged in distinct rings around the central cell. The marginal cells of *P. glanduliferum* have terminal glandular swellings. *Ankistrodesmus falcatus* has a curved fusiform cell and is generally found in bundles. Another common form is *Scenedesmus* with four or eight cells arranged with their longer axes parallel. *Scenedesmus quadricauda* has large, well developed spines which are elaborations of a delicate mucilaginous envelope.

I am now going to pass to a type of Algae in which the increase of growth is mainly in one direction resulting in the production of a filament. It is a case of unlimited division of a purely vegetative character. From the peripheral walls of the cell an annular ingrowth forms a septum which gradually cuts the cell in two. The parent walls are retained, the septum being new and common to both daughter cells. As this division goes on indefinitely, long filaments are produced. Usually the filament is attached only in the early stages (except in running water), hence masses of such filaments are found free-floating in ponds and ditches. Frequently the filaments are broken up into short lengths or even single cells, and these are easily borne about in the water to continue their growth under favourable circumstances. In the illustrations we have *Ulothrix*, *Microspora*, *Prasiola*, *Tribonema*, *Zygnema*, *Mougeotia* and *Spirogyra* all more or less common in ponds and ditches.

Ulothrix occurs in bright green masses, especially in the early spring. The chloroplast in the cell is ring or plate shaped with one or more pyrenoids. The cells are generally shorter in length than breadth or as long as broad giving a square appearance to the cell.

Microspora is a genus which favours stagnant water and is

PLATE 1.

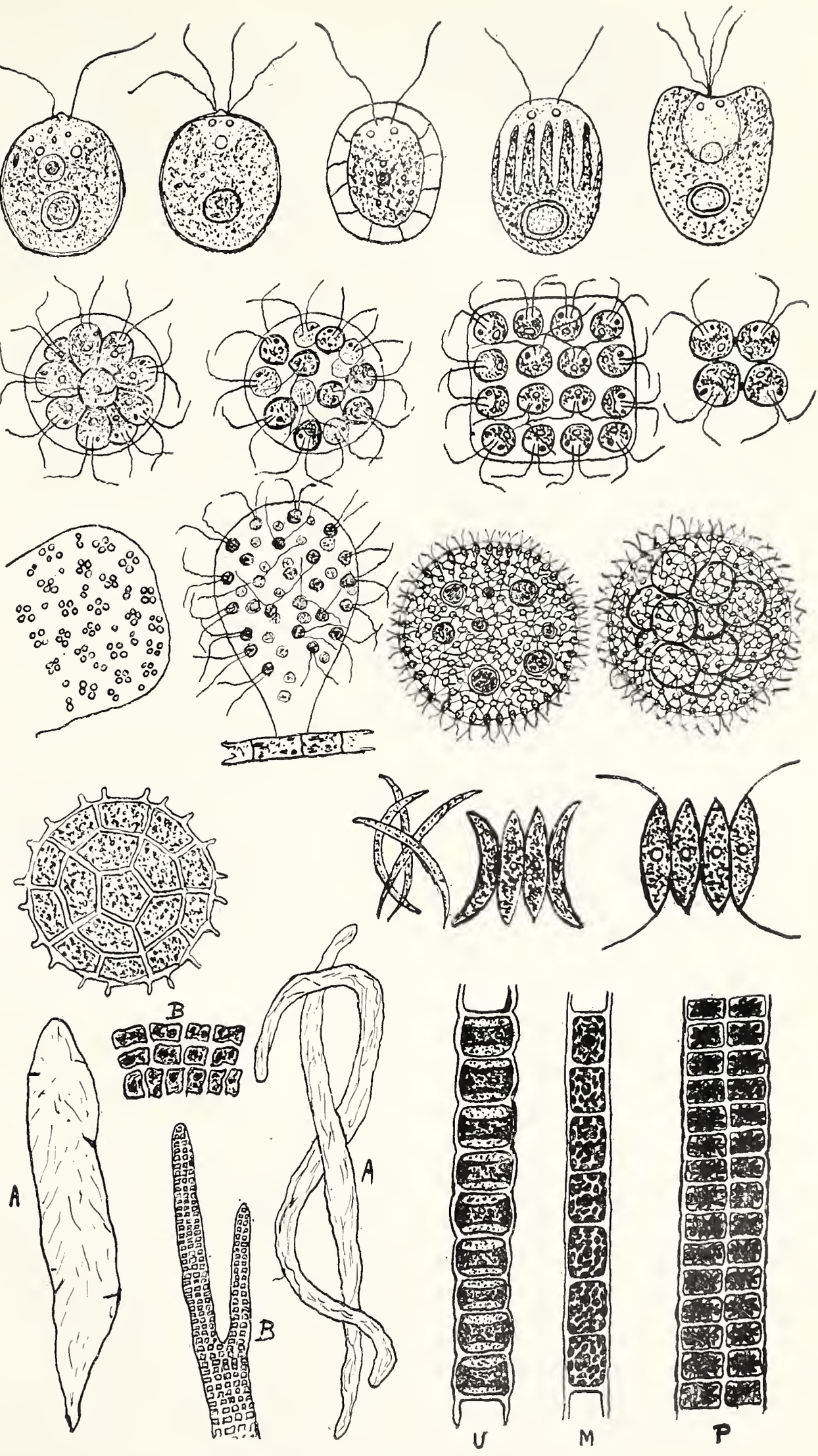

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PLATE 2.

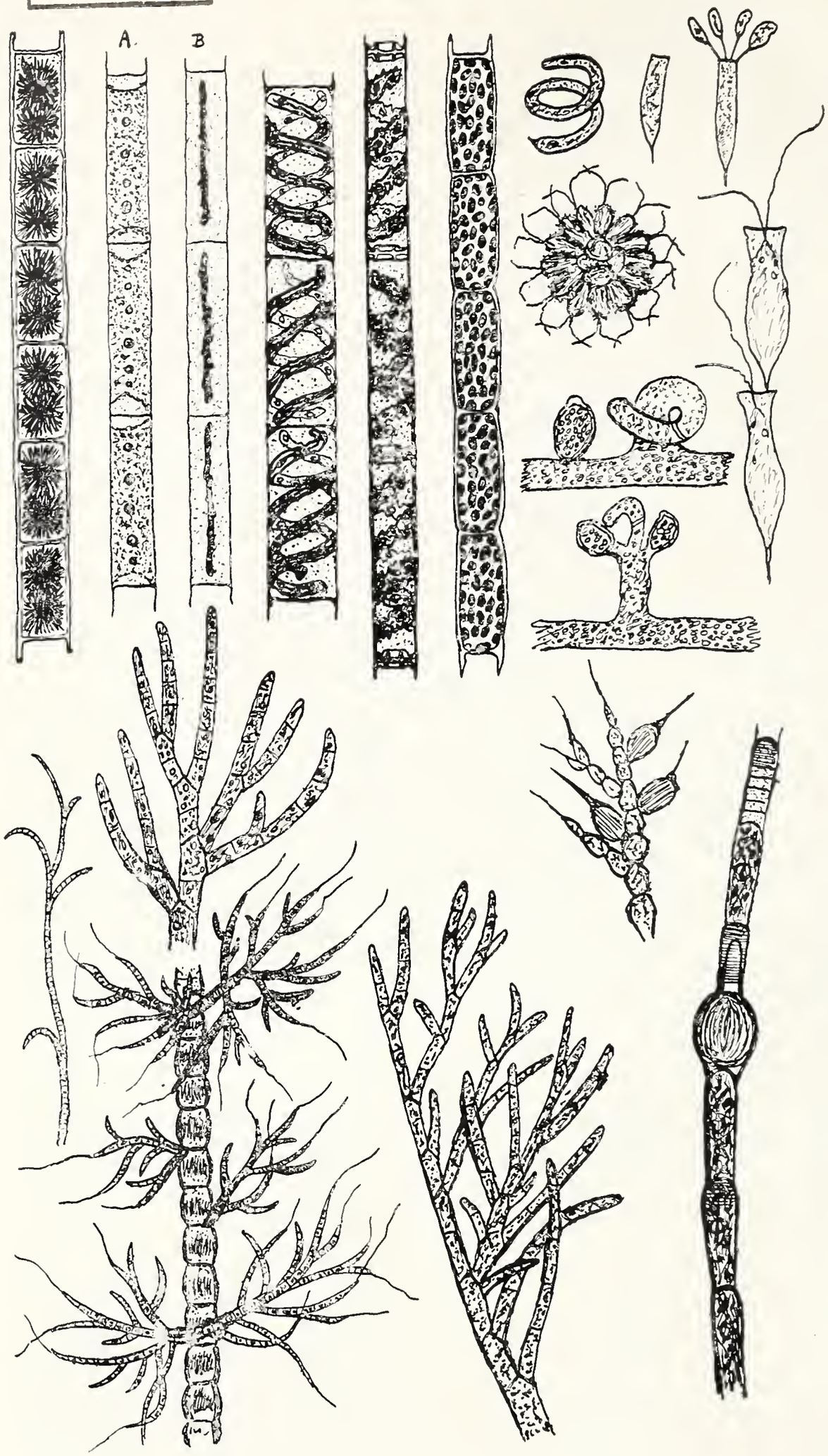

PLATE 3.

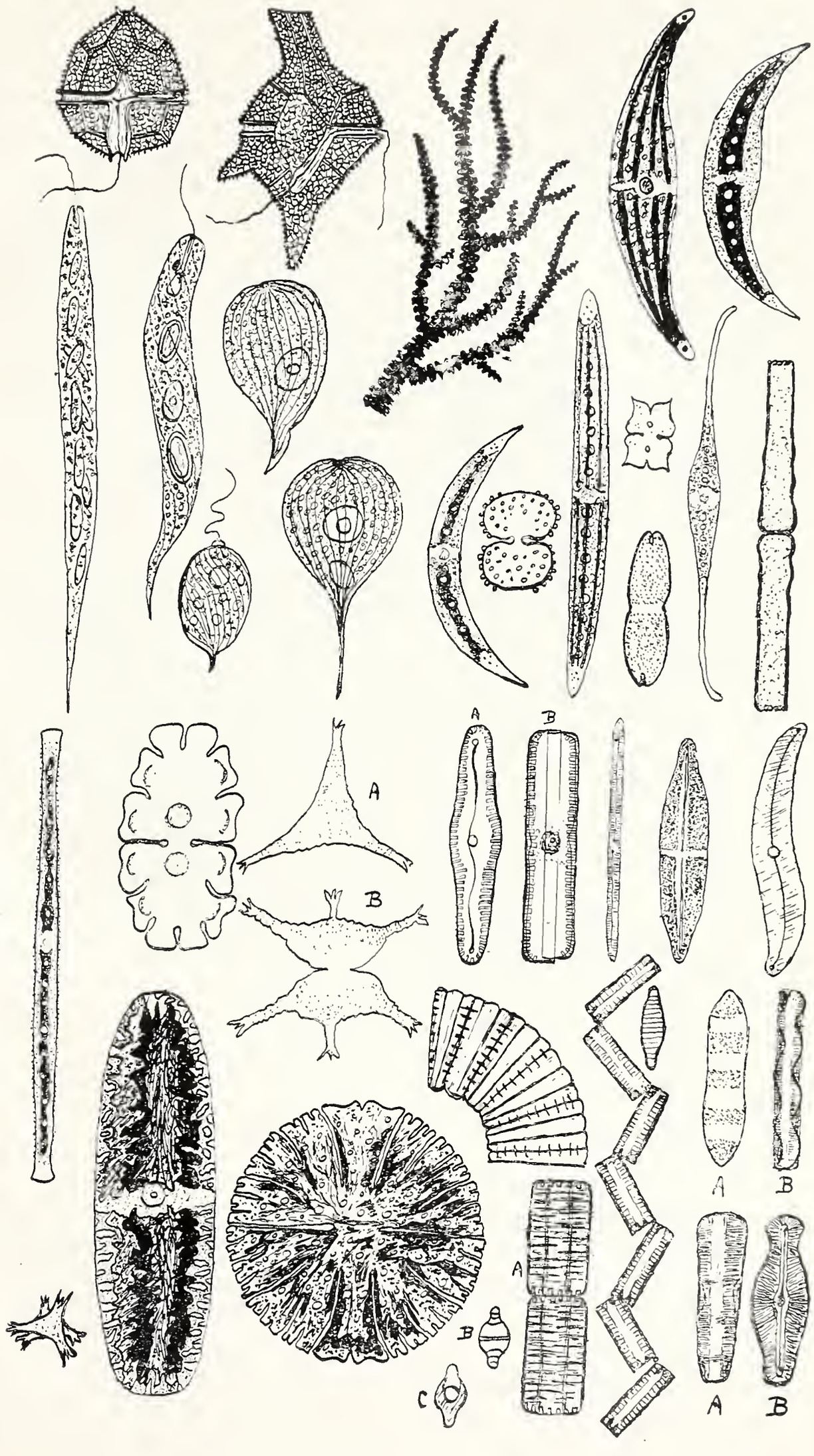

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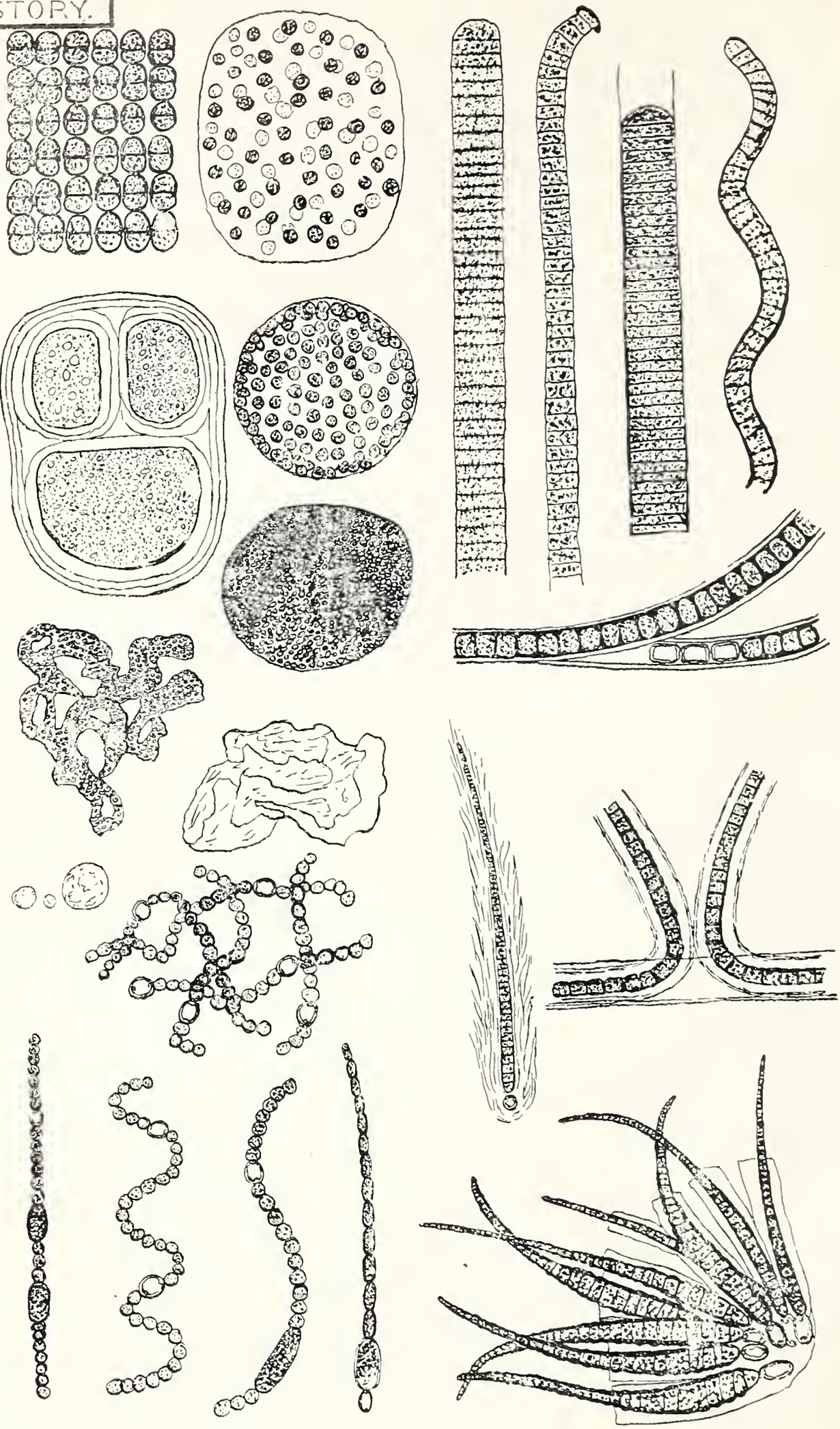
PLATE 4.



found during the winter months. The filaments frequently break up into pieces which are H shaped in optical section. The chloroplast is reticulate and is spread over the whole inner surface of the cell wall with characteristic thickenings which form parietal cushions.

Tribonema is often found associated with *Microspora*. The cells are slightly barrel-shaped. The chloroplasts are parietal, numerous and discoid.

Prasiola occurs on moist earth, rocks, stones, walls, etc. The filaments are either simple or irregular expansions with cells more or less arranged in groups of four. The chloroplast is stellate with one pyrenoid. The cell wall is strong rigid and hyaline.

Zygnema has two stellate chloroplasts in each cell with a large pyrenoid in each; it is common in ponds and ditches.

Mougeotia (A) has elongated cells with a thin axile plate like chloroplast. (B) shows a cell in which the chloroplast has rotated, giving a profile view. The rotation can be effected by exposing the filament to strong sunlight. The rotation is completed in about 30 min.

Spirogyra consists of a slimy-coated filament. The chloroplasts form characteristic narrow or broad spiral bands. Some almost straight, others closely wound with an axile series or in some species scattered pyrenoids. The edges of the chloroplast may be smooth, or serrated. The nucleus is suspended by protoplasmic threads in the centre of the cell. The transverse septa of the cells are mostly plain but a number of the smaller species possess replicate end walls.

Monastroma consists of a thin membranous plate with cells often in groups of four. In its early stages it is frequently found as a vesicular growth attached to the larger Algae or the stems of water-plants. Later it becomes a free floating mass.

Enteromorpha is very common in the brackish and fresh-water drains along the Lincolnshire coast from Cleethorpes to Skegness. It consists of a twisted tubular thallus often attaining a length of 12 to 15 in. It is frequently branched and is

green or yellowish green in colour. Masses of it cover the surface of the ditches in which it grows. The cells are in a simple layer and are rounded or polygonal.

We now pass to Algae that are distinctly branched:—

Cladophora is found both attached and free floating, and is very much branched. The cells are very much longer than broad and have stratified walls.

Draparnaldia is a very mucilaginous Alga with a main axis, from which spring short branches the apices of which frequently terminate in long hyaline hairs. The main cells are generally barrel-shaped with a chloroplast, the edges of which are deeply cut.

Chaetophora is frequently found as green cushions on submerged stones, the stems of water plants, and even on the shells of water snails. The filaments radiate from the base and are much branched (those of *C. elegans* resemble the antlers of a stag). The terminal cells are often prolonged into fine hyaline hairs of considerable length.

We now pass to the *Desmids* which may be considered among the most beautiful of microscopic objects. There are several thousands of known species of these beautiful plants. They exhibit a great variety of size and form. They are mostly unicellular and free floating and are confined to freshwater. Generally the cell exhibits a deep constriction on either side called a sinus which nearly cuts it into two portions joined only by a narrow isthmus. The two semicells thus produced are symmetrical. The cells of many *Desmids* are ornamented by warts, granules, spines, and even ridges which all greatly add to their beauty. Most of the *Desmids* secrete mucilage which is excreted through fine pores in the cell-wall. A local excretion, of large quantities of mucilage, from a specially large pore, is said by Klebs to be responsible for the movement of these plants. The chloroplasts are another striking feature; they are mostly axile, often exhibiting a system of plates and ridges with deep indentations. A few *Desmids* are filamentous in character. Another noticeable feature is the large terminal vacuoles found in many of them.

These vacuoles contain a number of dancing particles which have been shown to be crystals of calcium sulphate.

Oedogonium may be found in the early part of the year floating in bright green masses. The filaments are unbranched, the cells cylindrical with reticulate chloroplasts and numerous scattered pyrenoids. The nucleus is often very large. The upper ends of some cells exhibit a number of rings formed by cell division, and the presence of these may be taken as a certain indication that the cell possessing them belongs to *Oedogonium*.

Bulbochaete is a branched species found in still waters, generally attached. The enveloping mucus is often the home of numerous Diatoms and Desmids.

Vaucheria is very common on damp earth and in fresh-water. The filaments which are simply branched form a felt; there are no septa except when there is injury, then the injured part is cut off by a septa. The wall is thin and weak, the colour dark green owing to numerous small oval chloroplasts.

Ophiocytium occurs fairly commonly in ponds and pools.

Synura is composed of globose colonies of obovoid cells covered with short bristles and attached at the broad ends. Each cell has two cilia. It is found in ditches and pools, especially if these are of rain-water.

Dinobryon is composed of dendroid colonies, the cells are campanulate or cylindrical coming to a point at the base. They have a distinct eye-spot and two unequal cilia.

Peridinium cells are composed of a number of regularly arranged plates with transverse and longitudinal furrows with two cilia.

Ceratium, somewhat similar to *Peridinium*, but with one apical and two or three antapical horns.

Euglena is exceedingly common in ponds and ditches rich in organic matter. An eye-spot and flagellum are present with varying chloroplasts. There are also present paramylon grains either ring, rod-shaped or ovoid. Several species exhibit delicate straition.

Phacus, a flat, leaf-like, oval or elliptical periplast longi-

tudinally or spirally striated. The posterior end terminates in a spine either short or long.

Batrachospermum has branched filaments which appear bead-like; they are violet or blue-green in colour, with a thick mucous coat.

Diatoms. These minute Algae include about 12,000 species universally distributed in both salt and fresh water. In the living state they are simple cells consisting of a mass of protoplasm surrounded by a cell wall impregnated with silica. The largest diatom is only the 50th of an inch, and many of them only the 1000th of an inch in size. Each individual Diatom (a frustule) consists of two unequal valves joined together by two connecting bands which overlap. Each half of the Diatom is thus composed of two pieces, a valve and a connecting band, and the connecting band of the larger valve fits over that of the smaller like the lid of a pill box. The connecting bands together form the girdle. The Diatom is brown in colour. This is due to a substance called diatomin which completely obscures the chlorophyll. Diatoms may occur as free-floating individuals, while some form a chain, others grow on simple or branched stalks, while others are found in colonies enclosed in a common gelatinous investment.

I now pass to a large class of Algae which play a conspicuous part in all habitats hot, cold or temperate. They have widespread and marked powers of existence—the Myxophyceae or Cyanophyceae—commonly known as the Blue-green Algae. We will first consider a few colonial forms classed as Chroococcales and afterwards simple or branched filamentous forms the Hormogoneales.

Chroococcales:—*Aphanothece* is made up of a large number of elongated, clyindrical cells contained in a mass of mucilage. *Aphanocapsa* forms a similar colony, but the cells are more or less spherical in form.

Coelosphaerium is a spherical colony of globose or ellipsoidal cells. The cells are closely grouped just beneath the surface of the mucilage.

Microcystis is a colony of small globose cells densely

packed together in irregular shaped masses, the colour varying from blue-green to rose-purple.

Merismopedia is a one-layered plate of cells surrounded by mucilage. The cells are arranged in groups of four and are globose, ellipsoidal or even slightly angular in form.

sheath and they consist of disc-like cells which vary greatly in

Hormogoneales:—*Oscillatoria* has the trichomes devoid of a size. The ends of the trichome are sometimes rounded, sometimes pointed, or even furnished with a calyptra. The trichomes exhibit a slow creeping or gliding motion in a longitudinal direction with a slow oscillation of the anterior end.

Spirulina has its trichome twisted into a spiral, the coils of which are close or separated according to the species.

Lyngbya forms densely matted masses the filaments of which can be easily distinguished with a low-power objective. The sheath is firm and of varying thickness.

Tolypothrix has filaments with false branches which usually have three to five heterocysts at the point where they issue from the main filament.

Nostoc consists of a mass of jelly with a number of contorted moniliform trichomes. The masses are globose when young, but frequently break open to form flat irregular expansions when mature. The cells are spherical, barrel-shaped or cylindrical with heterocysts larger than the ordinary cells, but generally the same shape.

Anabaena has the trichomes either free floating or aggregated; the cells are generally round with round heterocysts, but more or less cylindrical spores.

Cylindrospermum: the cells and heterocysts are cylindrical. The heterocyst is always terminal. The spore is always developed from a cell adjacent to the heterocyst.

Rivularia occurs as a globose gelatinous mass attached to submerged plants or stones. It has numerous radiating branched filaments. Heterocysts are basal or intercalary at points of branching.

I now pass to the second part of my address which, as I previously mentioned, deals with the genera, species and habitat of Algae found in the northern part of the County.

PART II.

Lincolnshire is the second largest county in England with an area of 1,705,293 acres. No part of the area belongs to older rock formation consequently there is not that wealth of species such as is found in parts of Yorkshire, the Lake District, Wales and Scotland. The limestone, and the chalk of the Wolds, are comparatively poor collecting grounds. The waters of the clay-beds provide many of the commoner unicellular forms and an abundance of the filamentous species; many of the latter when examined have not been determinable as they were not in the fruiting stage. The boggy areas of N.W. Lindsey have provided many species but the fen parts have proved poor collecting grounds. The dykes and drains would probably be more productive were it not for the fact that they are periodically cleaned out.

As regards North Lincolnshire (with which we are mainly concerned) the principal physical feature is the Oolite escarpment which runs almost due S. from Winterton to Lincoln and beyond. On the west side and between it and the Trent is a low sandy tract which extends from Burton to beyond Scotter while further south there is a broad expanse of clay as far as Saxilby. On the east side from its crest there is a gentle fall to the valley of the Ancholme, and beyond the valley the Wolds chalk escarpment runs S.E. from Barton to Claxby (Alford). From Elsham southward the Oxford and Kimeridge clays, with cappings of boulder-clay, form a broad undulating table-land, intersected by numerous valleys, meeting the clay belt which runs along the eastern flank of the Wolds, from Goxhill to Burgh and Firsby, somewhat south of Spilsby. Stretches of gravel and sand occur between the clays and the escarpment running from the neighbourhood of Brigg to N. Willingham again in the neighbourhood of Spilsby and along the north bank of the Witham from Bardney to Tattershall.

A strip of alluvium, warp and fen land is found from the Isle of Axholme, running up the valley of the Ancholme, and around the shore of the Humber and along the coast, in varying depth until below Gibraltar point it spreads out in a

broad belt along the N.W. shore of the Wash.

There are no very large stretches of water but numerous small lakes, ponds and ditches afford good habitation for Algae. A systematic examination of the water has not been made but pH. of a number of samples was taken at the time of collection.

RECORDS.

The numbers refer to the sketch map of Lincolnshire by A. J. Jukes-Brown and the Rev. E. Adrian Woodruffe-Peacock.*

Aylesby 4	Gainsborough 5	Nettleton 3
Barnoldby 4	Grimsby 4	Saltfleetby 9
Benniworth 7	Holton-le-Clay 8	Scotton Common 5
Bradley 4	Horncastle 10	Sleaford 14
Brocklesby 3	Humberstone 9	Sturton Dist. 6
Burton Stather 2	Hykeham, S. 13	Swinhope 8
Caythorpe 13	Irby Dale 4	Tealby 7
Coates, L. & G. 4	Kirmington 3	Tetney 9
Clee 4	Linwood 7	Theddlethorpe 9
Cleethorpes 4	Louth 8	Thoresby, N. 8
Croxby 4	Manton 2	Waltham 4
Doddington 13	Newsham Lake 3	Waterlane 8
Elsham 3		Woodhall 10

The classification is that used by Dr. Fritsche in the revised edition of West's "British Freshwater Algae", and I want here to acknowledge the great debt I owe to Dr. Fritsche for much kindly help and valuable direction in the identification of species. Dr. Millard Griffith of Durham has also been kind enough to help me on several occasions.

The only known general list of Lincolnshire Freshwater Algae is the rather brief one published by J. Larder of Louth in *The Naturalist* for 1902 which at that date comprised all the records on the register of this Union. A number of the records were made by T. Spencer Smithson of Rochdale, who with W. West, identified the specimens taken by Mr. Larder. J. Burtt Davy commenced the compilation of the list. Dr. Fritsche has been kind enough to revise the nomenclature in

* Sketch Maps may be had from the Hon. Sec. 1/- each.

accordance with present day classification.

A list of Diatoms collected by John Lowe, M.D., in Sleaford District and determined by Professor Gregory was published in the Proceedings of the Botanical Society of Edinburgh 1856 and reprinted in *The Naturalist* in 1896. Other lists of Diatoms found at Clee by Arthur Smith were published in the *The Naturalist* 1902 and 1903.

CHLOROPHYCEÆ.

ISOKONTÆ.

VOLVOCALES.

Chlamydomonadaceæ.

Chlamydomonas Ehrenberg.

C. Franki Pascher. Grimsby.

C. globosa Snow. Kirmington.

C. Pertyi Gonschankin. Little Coates, Irby Dale.

Gonium Müller.

G. pectorale Müll. Gt. and Little Coates, N. Thoresby, Scotton Common, Doddington, Irby Dale, Theddlethorpe, Gainsborough, Barnoldby, Old Clee, Sturton Dist. (T. S. Smithson).

G. sociale Duj. Old Clee, Scotton Common, Gainsborough, Bradley, Little Coates, Irby, North Thoresby.

Eudorina Ehrenberg.

E. elegans Ehrenb. Gt. Coates, Old Clee, Linwood, Irby Dale, N. Thoresby, Manton Common, Gainsborough, Benniworth Haven.

Pandorina Bory.

P. morum (Müll.) Bory. Gt. Coates, N. Thoresby, Linwood, Waltham, Scotton Common, Irby, Doddington, Manton Common, Gainsborough, Old Clee, Horncastle, Sturton Dist. (T. S. Smithson), Woodhall Spa (J. Larder), Holton-le Clay, S. Hykeham.

Carteria Diesing.

C. multifilis (Fresen.) Dill. Kirmington, Elsham.

SPHÆRELLACEÆ.

SPHÆRELLA Sommerfeldt.

S. lacustris (Girod) Wittr. Grimsby.

VOLVOX Linneaus.

V. aureus Ehrenb. Theddlethorpe, N. Thoresby.

V. globator Ehrenb. Newsham Lake, N. Thoresby, Irby, Sturton Dist. (T. S. Smithson), Manton Common (W. C. Brown), Lincoln Dist. (Fairbank Catalogue).

PHACOTACEÆ.

PHACOTUS Perty.

P. lenticularis Stein. Tealby.

TETRASPORALES.

PALMELLACEÆ.

PALMODICTYON Kützing.

P. viride Kütz. N. Thoresby, Linwood.

P. varium Naeg. Woodhall, Linwood.

SHPAEROCYSTIS Chodat.

S. Schroeteri Chodat. Barnoldby.

ASTEROCOCCUS Scherffel.

A. superbus (Cienk) Scherffl. Manton Common.

GLOEOCYSTIS Naegeli.

G. gigas (Kütz.) Lagerh. Manton Common, Saltfleetby (J. Larder).

G. vesiculosa Naeg. Manton Common.

TETRASPORACEÆ.

SCHIZOCHLAMYS A. Braun.

S. gelatinosa A. Braun. Linwood.

TETRASPORA Link.

T. gelatinosa (Vauch.) Desv. Linwood, Louth, Barnoldby, N. Thoresby, Theddlethorpe, Old Clee.

T. lubrica Ag. N. Thoresby, Waltham, Bradley, Manton Common, Old Clee.

Apiocystis Naegeli.

A. Brauniana Naeg. Great Coates, N. Thoresby, Linwood, Irby, Horncastle, Kirmington, Sturton Dist. (T. S. Smithson).

CHLOROCOCCALES.

ZOOSPORINÆ.

Chlorococcaceæ.

Characium A. Braun.

C. subulatum A. Braun. Thoresby.

C. Pringsheimii A. Braun. Thoresby, Little Coates.

Hydrodictyaceæ.

Pediastrum Meyen.

P. boryanum (Turp.) Menegh. Newsham Lake, Linwood, Thoresby, Croxby, Scotton Common, Manton Common, Doddington, Gainsborough, Sturton Dist. (T. S. Smithson), Woodhall Spa (J. Larder), Holton-le-Clay.

P. glanduliferum Benn. Doddington.

P. duplex Meyen. Doddington.

P. tetras (Ehrenb.) Ralfs. Thoresby, Sturton Dist. (T. S. Smithson), Woodhall Spa (J. Larder).

AUTOSPORINÆ.

Oocystaceæ.

Oocystis Naegeli.

O. elliptica West. Thoresby, Woodhall.

O. solitaria Wittr. Woodhall.

Tetraedreæ.

Tetraedron Kütz.

T. regulare Kütz. Saltfleetby (J. Larder).

Selenastraceæ.

Ankistrodesmus Corda.

A. falcatus (Corda) Ralfs. Woodhall Spa (J. Larder), Thoresby, Doddington, Humberstone, Gainsborough, Irby, Woodhall, Old Clee, Holton-le-Clay.

KIRCHNERIELLA Schmidle.

K. lunaris (Kirchn.) Moeb. Thoresby.

CŒLASTRACEÆ.

SCENEDESMUS Meyen.

S. obliquus (Turp.) Kütz. Linwood, Doddington, Theddlethorpe, Waltham, Sturton Dist. (T. S. Smithson).

S. bijugatus (Turp.) Legerh. Linwood, Humberstone, Gainsborough, Old Clee, Sturton Dist. (T. S. Smithson), Saltfleetby (J. Larder).

S. quadricauda (Turp.) Breb. Little Coates, Linwood, Doddington, Waltham, Theddlethorpe, Sturton Dist. (T. S. Smithson), Woodhall (J. Larder), Holton-le-Clay.

ULOTRICHALES.

EU-ULOTRICHALES.

ULOTRICHACEÆ.

ULOTHRIX Kützing.

U. subtilis Kütz. Woodhall, Scotton Common, N. Thoresby, Tetney, Gainsborough, Old Clee, Little Coates.

U. tenuissima Kütz. Humberstone, Grimsby.

U. zonata (Web. & Mohr.) Kütz. Sturton Dist. (T. S. Smithson).

HORMIDIUM Kützing.

H. subtilis Heering. Woodhall, Manton Common.

H. flaccidum Kütz. Old Clee, Irby.

GEMINELLA Turpin.

G. interrupta Turp. Barnoldby.

G. ordinata West. Theddlethorpe, Barnoldby.

ULVACEÆ.

MONASTROMA Thuret.

M. membranacea W. & G. West. Old Clee, Tetney, Waltham, Little Coates, Humberstone.

M. bullosa (Roth.) Wittr. Old Clee, Great Coates, Little Coates, Humberstone.

ENTEROMORPHA Link.

E. intestinalis Link. Tetney, Cleethorpes, Humberstone, Theddlethorpe.

Microsporaceæ.

Microspora Thuret.

M. amoena (Kütz.) Lagerh. Water-lane, Irby, Thoresby, Swinhope.

var. *crassior* Hansg. Water-lane.

M. floccosa (Vauch.) Thur. Woodhall, Sturton Dist. (T. S. Smithson).

M. tumidula Hazen. Bradley.

PRASIOLALES.

Prasiolaceæ.

Prasiola Agardh.

P. crispa forma *muralis* (Kütz.) G. S. West. Grimsby.

CLADOPHORALES.

Cladophoraceæ.

Rhizoclonium Kützing.

R. hieroglyphicum Kütz. Sturton Dist. (T. S. Smithson), Woodhall Spa (J. Larder).

Cladophora Kützing.

C. fracta Kütz. Sturton Dist. (T. S. Smithson).

C. glomerate Kütz. Sturton Dist. (T. S. Smithson).

CHÆTOPHORALES.

Chætophoraceæ.

Stigeoclonium Kützing.

S. fastigiatum Kütz. Sturton Dist. (T. S. Smithson).

S. tenue Kütz. Thoresby, Linwood, Gt. Coates, Irby, Old Clee, Gainsborough, Bradley, Swinhope.

S. amoenum Kütz. Thoresby, Cleethorpes.

S. longipilum Kütz. Humberstone.

Draparnaldia Bory.

D. plumosa Vauch. Thoresby, Louth, Bradley, Old Clee, Humberstone, Little Coates.

D. glomerata (Vauch.) Agardh. Humberstone, Sturton Dist. (T. S. Smithson).

CHÆTOPHORA Schrank.

C. elegans (Roth.) Ag. Thoresby, Tetney, Gt. Coates, Old Clee, Newsham Lake, Linwood, Irby, Barnoldby, Manton Common, Nettleton, Sturton Dist. (T. S. Smithson), Little Coates.

C. pisiformis (Roth.) Ag. Thoresby, Tetney, Gt. Coates, Old Clee, Little Coates, Irby.

C. tuberculosa (Roth.) Ag. Nr. Waltham.

C. incrassata (Hudson) Hazen. Great Coates, Irby Dale, Thoresby.

MICROTHAMNION Naegeli.

M. Kützingianum Naeg. Scotton Common, Waltham, Thoresby.

M. strictissimum Raberh. Nettleton.

PSEUDOCHÆTE W. & G. West.

P. gracilis W. & G. West. Irby Dale.

APHANOCHÆTE A. Braun.

A. repens A. Braun. Irby, Thoresby, Woodhall, Manton Common.

COLEOCHÆTACEÆ.

COLEOCHÆTE.

C. scutata Bréb. Sturton Dist. (T. S. Smithson), N. Thoresby, Woodhall.

CHÆTOSPHÆRIDIUM Klebahn.

C. globosum (Nordst.) Klebahn (on *Œdogonium*). Woodhall.

ŒDOGONIALES.

ŒDOGONIACEÆ.

ŒDOGONIUM Link.

O. Hirnii Gutw. Horncastle.

BULBOCHÆTE Agardh.

B. nana Wittr. Thoresby, Scotton Common.

B. intermedia De Bary. Sturton Dist. (T. S. Smithson).

CONJUGATÆ.

ZYGNEMALES.

Gonatozygaceæ.

Gonatozygon De Bary.

G. Kinahani (Arch.) Rabenh. Humberstone, Woodhall.

G. Brebissonii De Bary. N. Thoresby, Humberstone, Waltham, Old Clee.

G. monotaenium De Bary. Humberstone.

Zygnema Agardh.

Z. stellinum (Vauch.) Agardh. Newsham Lake, Gt. Coates, Linwood, Thoresby, Tetney, Humberstone, Aylesby, Theddlethorpe, Sturton Dist. (T. S. Smithson), Woodhall.

Z. cruciatum Ag. Humberstone, Little Coates.

var. *Hausmanni* De Not. Manton Common.

Z. insigne (Hass.) Kütz. Linwood, Nr. Waltham.

Spirogyra Link.

Sp. crassa Kütz. Linwood, Brocklesby, N. Thoresby, Irby.

Sp. inflata (Vauch.) Rabenh. Irby, Old Clee.

Sp. insignis (Hass.) Kütz. Irby Dale.

Sp. tenuissima (Hass.) Kutz. N. Thoresby, Little Coates, Gainsborough, Sturton Dist. (T. S. Smithson), Saltfleetby (J. Larder), Nr. Sleaford (J. Larder).

Sp. condensata Kütz. Saltfleetby (J. Larder).

Sp. Hassallii (Jenner) Petit. Little Coates, Louth Road near Grainsby.

Sp. communis (Hass.) Kutz. Irby Dale.

Sp. decima (Mull.) Kutz. Irby Dale.

Sp. nitida (Dillw.) Link. Humberstone.

Sp. varians (Hass.) Kutz. Old Clee, Louth Road.

Sp. protecta Wood. Humberstone, Nettleton.

Sp. Weberi Kutz. Nettleton.

Sp. mirabilis (Hass.) Kutz. Gainsborough (Thonock Park).

S. flavescens Kutz. Sturton Dist. (T. S. Smithson), Nr. Sleaford (J. Larder).

Mougeotia Agardh.

M. gracillima (Hass.) Wittr. Linwood.
M. scalaris Hass. Barnoldby.
M. parvula (Hass.) Wittr. N. Thoresby, Linwood.
M. viridis Wittr. Nettleton.
M. genuflexa Ag. Nr. Sleaford (J. Larder), Sturton Dist. (T. S. Smithson), Saltfleetby (J. Larder).
M. nummuloides Hass. Sturton Dist. (T. S. Smithson).
M. quadrangulate Hass. Sturton Dist. (T. S. Smithson).
M. ovalis Nordst. N. Thoresby.

DESMIDIACEÆ.

Penieæ.

Penium Brebisson.

P. libellula (Focke) Nordst. Doddington.

Closterieæ.

Closterium Nitzsch.

C. aciculare West. Linwood, N. Thoresby, Barnoldby, Waltham.
C. parvulum Naeg. Linwood, Irby Dale, Little Coates, Theddlethorpe.
C. moniliferum (Bory) Ehrenb. Bradley, Gt. Coates, Barnoldby, Irby, Saltfleetby (J. Larder).
C. lunula Ehrenb. Gt. and Little Coates, Sturton Dist. (T. S. Smithson).
C. Leibleinii Kutz. Linwood, Barton St. near Ashby Hill, Gainsborough.
C. striolatum Ehrenb. Barnoldby, Irby, Linwood.
C. Ehrenbergii Menegh. Gt. Coates, Manton Common, Barton St., Irby Dale, Barnoldby, Nettleton, Little Coates, Old Clee.
C. acerosum (Schrank) Ehrenb. Scotton Common, Bradley, Gt. Coates, Gainsborough.
C. acer var. *minus* Hantzsch. Irby, Theddlethorpe.
C. Dianae Ehrenb. Scotton Common, Linwood.

C. Kützingii Breb. Doddington, Irby, Manton Common, Elsham.
C. strigosum Breb. Barton Street.
C. lanceolatum Kutz. Bradley Wood, Irby, Old Clee.
C. siliqua West. Humberstone, Gt. Coates, Irby.
C. rostratum Ehrenb. Saltfleetby (J. Larder), Elsham, Old Clee, S. Hykeham.
C. pronum Breb. Barnoldby.
C. Malvernianum De Not. Irby, Barnoldby, Manton Common.
C. Jenneri Ralfs. Irby.
C. setaceum Ehrenb. Manton Common.
C. praelongum Breb. Manton Common.
C. ceratium Perty. Manton Common.
C. intermedium Ralfs. Linwood.
C. peracerosum Gay. Croxby.
C. Cynthia De Not. Old Clee.
C. Pritchardianum Arch. Old Clee.

PLEUROTÆNIUM Naegeli.

P. trabecula (Ehrenb.) Naeg. Scotton Common, Irby Dale, Woodhall.
P. Ehrenbergii (Breb.) De Bary. N. Thoresby.
P. Hutchensonii (Turp.) W. & G. S. West. Linwood.
P. coronatum (Breb.) Rebenh. Manton Common, Irby.

TETMEMORUS Ralfs.

T. granulatus (Breb.) Ralfs. Scotton Common.

EUASTRUM Ehrenberg.

E. oblongum (Greer) Ralfs. Scotton Common.
E. pectinatum Breb. Scotton Common.

MICRASTERIAS Agardh.

M. denticulata Breb. Scotton Common, Doddington, Sturton Dist. (T. S. Smithson).
M. Thomasiana Arch. Manton Common.

COSMARIUM Corda.

C. humile var. *glabrum* Gay. Humberstone.
C. reniforme (Ralfs) Arch. (var. *compressum*). Thoresby.
C. margaritiferum Menegh. Manton Common, Theddlethorpe.

C. Meneghinii Breb. Thonock Park, Manton Common, Woodhall, Theddlethorpe, Saltfleetby (J. Larder), Old Clee.

C. botrytis Menegh. Sturton Dist. (T. S. Smithson), Saltfleetby (J. Larder).

C. Turpinii var. *Lundellii* Gutw. Saltfleetby (J. Larder).

C. granatum var. *subgranatum* Nordst. Saltfleetby (J. Larder).

ARTHRODESMUS Ehrenberg.

A. incus (Breb.) Hass. Doddington.

STAURASTRUM Meyer.

S. vestitum Ralfs. Humberstone.

S. brachiatum Ralfs. Thoresby.

SPHÆROZOSMA Corda.

S. excavatum Ralfs. Humberstone.

HYALOTHECA Ehrenberg.

H. dissiliens (Sm.) Breb. Scotton Common.

H. mucosa (Dillw.) Ehrenb. Scotton Common.

SIPHONALES.

VAUCHERIACEÆ.

VAUCHERIA de Candolle.

V. sessilis (Vauch.) D.C. Old Clee, Gt. Coates, Thoresby, Bradley, Sturton Dist. (T. S. Smithson).

V. geminata (Vauch.) D.C. Gt. Coates, Irby, Old Clee.

V. terrestris Lyngb. Old Clee.

V. hamata (Vauch.) Lyngb. Old Clee, Sturton Dist. (T. S. Smithson).

HETEROKONTÆ.

HETEROCHLORIDALES.

MISCHOCOCCALES.

MISCHOCOCCUS Naegeli.

M. confervicola Naeg. Little Coates, Irby, Thoresby, Old Clee.

HETEROCAPSALES.

BOTRYOCOCCUS Kützing.

B. Braunii Kütz. Little Coates, Old Clee, Thoresby, Woodhall.

HETEROCOCCALES.

Chlorotheciaceæ.

Characiopsis Borzi.

C. minuta (A. Br.) Borzi. Irby.

Ophiocytiaceæ.

Ophiocytium Naegeli.

O. majus Naeg. Linwood, Gt. Coates, N. Thoresby, Barnoldby, Manton Common, Waltham.

O. cochleare (Eickw.) A. Br. Irby Dale, Bradley, Thoresby, Little Coates.

O. arbuscula (A. Br.) Rabenh. Bradley, Thoresby, Little Coates, Saltfleetby (J. Larder).

HETEROTRICHALES.

Tribonemaceæ.

Tribonema Derbes & Solier.

T. bombycinum (Ag.) Derbes & Sol. Old Clee, Humberstone, Laceby, Waltham, Bradley, Manton Common, Little Coates, Thoresby, Nettleton, Swinhope, Sturton Dist. (T. S. Smithson), S. Hykeham.

var. *genuina* Heering. Saltfleetby (J. Larder).

var. *minor* (Wille) G. S. West. Scawby, Irby, Woodhall, Swinhope.

T. tenerrimum Heering. Sturton Dist. (T. S. Smithson).

CHRYSOPHYCEÆ.

CHRYSOMONODALES.

HYMENOMONADALES.

Isochrysidaceæ.

Syncrypta Ehrenberg.

S. volvox Ehrenb. Scotton Common, Doddington, Irby, Horncastle.

Euhymenomonadaceæ.

Synura Ehrenberg.

S. uvella Ehrenb. Linwood, Doddington, Little Coates, Irby,

Barnoldby, Thoresby, Manton Common, Old Clee, Benniworth Haven.

OCHROMONADALES.

OCHROMONADACEÆ.

UROGLENA Ehrenberg.

U. volvox Ehrenb. Tetney, Barnoldby, Irby.

DINOBRYON Ehrenberg.

D. cylindricum Imhof. Thoresby, Linwood, Doddington, Scotton Common.

D. sertularia Ehrenb. Thoresby, Linwood, Humberstone, Waltham, Irby.

BACILLARIALES (Diatomales).

CENTRICÆ.

DISCOIDEÆ.

MELOSIRACEÆ.

MELOSIRA Agardh.

M. varians Ag. Humberstone, Saltfleetby, Benniworth Haven.

PENNATÆ.

FRAGILARIOIDEÆ.

MERIDIONACEÆ.

MERIDION Agardh.

M. circulare (Grev.) Ag. Old Clee, Benniworth Haven, Little Coates.

DIATOMACEÆ.

DIATOMA de Candolle.

D. vulgare Bory. Theddlethorpe, Thoresby, Waltham, Grimsby, Little Coates.

D. elongatum tenue Ag. var. *elongatum* Lyngb. Waltham, Little Coates, Grimsby, Saltfleetby (J. Larder).

FRAGILARIACEÆ.

FRAGILARIA Lyngbye.

F. capucina Desmaz. Holton-le-Clay.

SYNEDRA Ehrenberg.

S. pulchella Kütz. Waltham, Barnoldby, Thoresby, Grimsby, Theddlethorpe, Benniworth Haven.

S. Ulna Ehrenb. Grimsby.

S. lunaris Ehrenb. Nettleton.

S. capitata Ehrenb. Waltham.

S. acus Kütz. Saltfleetby (J. Larder).

ACHNANTHOIDEÆ.

ACNANTHACEÆ.

COCCONEIS Ehrenberg.

C. placentula Ehrenb. Saltfleetby (J. Larder).

NAVICULOIDEÆ.

NAVICULACEÆ.

PINULARIA Ehrenberg.

P. viridis Ehrenb. Elsham.

STAURONEIS Ehrenberg.

S. Phœnicenteron (Nitzsch.) Ehrenb. Irby.

GOMPHONEMACEÆ.

GOMPHONEMA Agardh.

G. gemmatum (Lyngb.) Ag. Barnoldby, Theddlethorpe, Thoresby.

G. curvatum Kütz. Saltfleetby (J. Larder).

G. dichotomum Kütz. Saltfleetby (J. Larder).

G. constrictum Ehrenb. Holton-le-Clay.

CYMBELLACEÆ.

CYMBELLA Agardh.

C. ventricosa (Kütz.). Holton-le-Clay.

NITZSCHIOIDEÆ.

NITZSCHIACEÆ.

BACILLARIA Gmelin.

B. paradoxa Gmelin. Cleethorpes.

NITZSCHIA Hassall.

N. acicularis Kütz. Old Clee, Waltham.

N. taenia W. Smith. Old Clee.

SURIRELLOIDEÆ.

Surirellaceæ.

Cymatopleura W. Smith.

C. Solea Breb. Irby, Benniworth Haven, Old Clee, Kirmington, Holton-le-Clay.

DINOPHYCEÆ (PERIDINIEÆ).

Gymnodinium Stein.

G. paradoxum Schilling. Grimsby.

Peridinium Ehrenb.

P. cinctum Ehrenb. Linwood, Waltham.

Ceratium Schrank.

C. cornutum Clap. & Lachm. Linwood.

EUGLENINEÆ.

Euglenaceæ.

Euglena Ehrenberg.

E. proxima Dang. Tealby.

E. sanguinea Ehrenb. Tealby.

E. acus Ehernb. Thoresby.

E. spirogyra Ehrenb. Old Clee, Thoresby, Kirmington, S. Hykeham.

E. tripteris (Duj.) Klebs. Kirmington.

E. viridis Ehrenb. Burton Stather.

Lepocinclis Perty.

L. ovum (Ehrenb.) Lemm. S. Hykeham.

Phacus Dujardin.

P. pleuronectes Duj. Humberstone, Old Clee, Irby, Bradley, Manton Common, Thonock Park, Kirmington, S. Hykeham.

P. longicauda (Ehrenb.) Duj. Manton Common, Irby, Old Clee, Theddlethorpe.

P. pyrum Ehrenb. Grimsby, S. Hykeham.

RHODOPHYCEÆ.

Batrachospermum Roth.

B. moniliforme Roth. Newsham Lake, Old Clee, Great Coates,

Thoresby, Hubbard's Valley near Louth (J. Larder).

B. atrum (Dillw.) Harvey. Old Clee.

B. vagum (Roth.) Ag. N. Thoresby.

MYXOPHYCEÆ (CYANOPHYCEÆ)

CHROOCOCCALES.

Chroococcaceæ.

Merismopedia Meyer.

M. glauca (Ehrenb.) Naeg. Doddington, Thoresby, Saltfleetby (J. Larder), Woodhall Spa (J. Larder).

M. elegans A. Braun. Thoresby, Freshney Bog, Kirmington.

M. convoluta Breb. Gainsborough (Thonock).

Tetrapedia Reinsch.

T. Reinschiana Arch. Kirmington.

Cœlosphærium Naegeli.

C. Kutzingianum Naeg. Manton Common, Woodhall Spa (J. Larder).

Microcystis Kützing.

M. stagnalis Lemm. Manton Common.

M. marginata (Menegh) Kütz. Elsham.

Aphanocapsa Naegeli.

A. Grevillei (Hass.) Raben. Waltham.

CHAMÆSIPHONALES.

Chamæsiphonaceæ.

Chamæsiphon A. Braun & Grunow.

C. incrustans Grun. Manton Common.

HORMOGONEALES.

Oscillatoriaceæ.

Oscillatoria Vauch.

O. Agardii Gomont. Waltham.

O. Borneti Zukal. Waltham.

O. limosa Ag. Gt. Coates.

O. tenuis Ag. Brocklesby Park.

Spirulina Turpin.

S. major Kütz. N. Thoresby, Sturton Dist. (T. S. Smithson).

ARTHROSPIRA Stizenberger.

A. Jenneri Stiz. Grimsby.

PHORMIDIUM Kützing.

P. tenue Menegh. N. Thoresby.

LYNGBYA C. Agardh.

L. major Menegh. Nr. Thoresby.

L. æstuarii (Mert.) Liebm. Humberstone.

L. turfosa (Carm.) Cooke. Sturton and Till Bridge (T. S. Smithson).

NOSTOCACEÆ.

NOSTOC Vaucher.

N. coeruleum Lyngb. Gt. and Little Coates, Linwood, Doddington, Thoresby, Irby, Sturton Dist. (T. S. Smithson).

N. commune Vauch. Gt. and Little Coates, Linwood, Caythorpe (J. B. Davy).

ANABAENA Bory.

A. inequalis (Kütz.) Born. & Flah. Gt. Coates, N. Thoresby, Manton Common, Humberstone.

A. oscillarioides var. *tenuis* Lemm. Barton Street.

A. Lemmermanni Richter. Gainsborough (Thonock).

NODULARIA Mertens.

N. sphaerocarpa Born. & Flah. N. Thoresby.

CYLINDROSPERMUM Kützing.

C. stagnale (Kütz.) Born. & Flah. Irby Dale.

SCYTONEMA Agardh.

S. mirabile (Dillw.) Born. Barnoldby.

TOLYPOTHRIX Kutzing.

T. lanata (Desv.) Wartm. Thoresby, Irby, Waltham, Woodhall, Sturton Dist. (T. S. Smithson).

RIVULARIA (Roth.) Agardh.

R. dura Roth. Little Coates, N. Thoresby, Sturton Dist. (T. S. Smithson).

GLEOTRICHIA J. Agardh.

G. natans (Hedw.) Rabenh. Humberstone.

PHENOLOGICAL OBSERVATIONS IN LINCOLNSHIRE.

We have been appealed to by the conductors of this branch of the Royal Meteorological Society for assistance in filling up gaps that occur among the "areas" of Lincolnshire, a very important part of which is without observers. This work is becoming more and more extensive and necessitates the compilation of a report of some seventy pages, a copy of which is supplied to each observer.

A form is forwarded to the observer setting out instructions and giving lists of objects to be noted. These include a number of plants, the date of first flowering of which is to be recorded, some half-a-dozen birds and a similar number of insects, the appearance of which is to be noted.

A supplementary list of Plants and Birds also appears on the schedule and though valuable is of less importance than the primary list.

The north of the County is well served, but south of Louth observers are needed in all districts. The areas, as marked out on the Phenological Map, that are in need of helpers are Bourne, Grantham, Holbeach, Sleaford, Spalding, Horncastle, Alford, Skegness and Boston.

The work is of a most interesting nature and not at all oppressive. Observers may select their own subject for recording, the completion of the whole schedule not being imperative though, of course, desirable.

We sincerely hope that this work will be taken up so that Lincolnshire may be justly represented in this branch of scientific research. A. Hampton Brown, Royal Meteorological Society, 49, Cromwell Road, South Kensington, S.W 7., will be only too pleased to supply schedules and give any explanation, or if preferable application may be made in the first instance to Arthur Smith, City and County Museum, Lincoln.

BRITISH
MUSEUM
8 JUN 31
NATURAL
HISTORY.

H. WALLIS KEW.
President 1927.

The Twenty-fifth President

OF THE

Lincolnshire Naturalists' Union.

H. WALLIS KEW.

When our post of honour was offered to Mr. Kew the thoughts uppermost in our minds were not of his volume on the means of dispersal of the mollusca (for which Alfred Russell Wallace wrote a preface), his synopsis of the British false-scorpions (on which animals he has long been recognized as the authority in this country), his numerous memoirs in the Proceedings of the Zoological Society of London and elsewhere, or of other such things. They were more of his association with Lincolnshire Natural History, and of the many first county records of molluscs, arachnids, and some of insects, etc., standing to his credit. He left Lincolnshire as long ago as 1887; but he was, after that, in the habit of making annual visits to the county during many years.

He was born at Louth, in 1868, that is to say, at the same place and in the same year as Mr. R. W. Goulding, who, if he had still been with us, would doubtless have taken this opportunity of adding something to what he had already written of his friend. In their early years (together with three others of similar age) they started the Louth Naturalists' Society: the first society of its kind in the county. From these small beginnings (after many changes of title and constitution) grew the present Louth Antiquarian, Naturalists' and Literary Society; whereof, when its Museum was opened in 1910, Mr. Goulding wrote a "Twenty-six years' Retrospect," in which he hailed our ex-President as the founder, with some kindly observations which may fittingly be quoted in this place.

"To state the facts briefly (Mr. Goulding wrote), the society was founded by Harry Wallis Kew in the year 1884, when he was fifteen years of age, and to him alone belongs the

credit of conceiving the idea and of gathering friends around him so that his idea might have practical effect. Mr. Kew had the advantage of inheriting some of the tastes of his grandfather, Mr. Thomas Wilkinson Wallis, and much of that capacity for taking pains which was one of his grandfather's most notable characteristics. Mr. Wallis had formed great collections of local plants and insects, and to these his grandson had access, and, what was even more important, he had ample opportunities of observing and imitating the precision and the thoroughness which marked the manifold phases of his grandfather's work. His incipient interest in nature-study was further stimulated by the training he received at the hands of his schoolmaster, our late President, Mr. Samuel Cresswell, who often took occasion to direct the attention of his pupils to natural phenomena. With these early tendences and advantages it is not surprising that at the age of fifteen Mr. Kew was already a naturalist of seven years' standing. In 1877 he had noticed the prevalence of the intermittent 'Clouded Yellow,' and when I began to pay attention to insects in the early eighties (prompted thereto by a prize offered at the Grammar School), he was able to tell me about 'Clouded Yellows,' 'Brimstones,' and 'Peacocks' with the air of an experienced observer".

The society's first excursion was to the Burwell, Haugham, and Muckton Woods; and in the last named of these woods, as will be seen in the present part of these *Transactions*, our ex-President (forty-six years later) was again with us. Mr. Kew had in fact described the Heronry of Muckton Wood in a small paper in *The Naturalist's World*, vol. II., 1885, p. 129. His later Lincolnshire work (both before and after he left the county) was adequately dealt with, and fully acknowledged by William Denison Roebuck in his Presidential Addresses of 1909 and 1910, which many of us remember.

It all seems long ago, and the present writer, probably alone among the members of the Union now living, can claim to have co-operated with him in matters of county natural history, almost from the beginning. A. S.

Ray's Journey through Lincolnshire, 1661.

H. WALLIS KEW.

It is recorded of Ray that he extended his pursuits throughout the greatest part of England and Wales, and part of Scotland, and accounts of some of his journeys were published, as "Mr. Ray's Itineraries",[1]—many years after his death—the principal observations having then been transcribed from his notes. The journey of "Itinerary II"—made into Scotland as far as Edinburgh, Stirling, and Glasgow—involved a passage through Lincolnshire; and that part of the account which concerns this county is reprinted here. Its interest (apart from the personality of Ray) belongs largely to its date,[2] and it may be recalled that the year was that following the Restoration, that Linnaeus was unborn, and the present system of biological nomenclature unthought of. Ray was at Cambridge, Fellow of Trinity College, recently ordained deacon and priest, and in his thirty-fourth year. He was accompanied on this journey by Philip Skippon (B.A. from Trinity College, 1660),[3] and (it appears) by one servant.

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[1] In Derham's *Select Remains of John Ray*, edited by George Scott, 1760.

[2] At Edinburgh "Argyle and Guthry, their heads [were seen] standing on the gates and toll-booth." At the same time, "divers women, they reported to the number of about 120," were burnt for witches.

[3] Venn, *Alumni Cantab.* Philip Skippon, afterwards Sir Philip, at this time in his 20th year. Son of Major-General Philip Skippon (with whom Lankester's *Memorials of John Ray* confuses him). Travelled abroad with Ray and Willughby: wrote (Churchill, VI) an account of their journey. F.R.S., 1667. Scott states that Willughby was of the present party; but cp. Ray's letters (1) to him quoted below, and (2: Gunther's *Further Correspondence of John Ray*) to Courthope: "my company is only Mr. Skippon and a servant."

They left Cambridge on July 26th, and on that day, passing through Huntingdon and Stilton, they rode as far as Peterborough, 25 miles. There they heard the Cathedral-service: the choristers making them pay money for coming into the choir with their spurs on. Next day they entered this county.

July the 27th, we rode on to Crowland, 6 miles; and there we viewed the famous Abbey-Church, so much of it as is yet standing. The roof within, covered with wood, hath been curiously gilded; and round about on the sides, underneath the roof, are artificially carved many species of animals, both beasts and birds. In the time of the late Wars this Church was made a garrison, and held for the King: when it was taken by the Parliament, . . This Church seemeth to have been built Cathedral-wise, but now there remains only part of the body of the Church, the choir and cross building being all fallen down. Crowland is noted for a Bridge, standing on the confluence of two waters upon three feet, without any pillar in the middle to support it. From Crowland to Spalding we rode upon a very firm bank, for the space of 8 miles, lately thrown up by Colonel Walton.[4] We observed at Spalding, Sir Anthony Oldfield's house.[5] The town is well built and handsome, such as no man would hope to find in such fens and plashes as environ it on all sides,[6] especially not having the bene-

[4] Valentine Walton. Oliver Protector's brother-in-law.

[5] Sir Anthony Oldfield (1626—1668) then High Sheriff of the county. After the dissolution (G. W. Bailey *in lit.*) Spalding Priory passed to the Oldfields, and Sir Anthony's house (whereof there are no remains now standing) was built from the Priory materials. Gough (*Camden*, 1789): "The Oldfield mansion-house is converted into a workhouse."

[6] Cp. Camden (*Britannia*, 1607): "sedet riuulis & incilibus vndique conclusum, opidum sane elegantius quam hoc tractu inter aquosas restagnationes expectares." (Holland's ed., 1610: "enclosed round about with riverets and draines, a fairer towne than a man would looke to finde in this tract among such slabbes and water-plashes"). Ray's notes probably mentioned Camden here.

fit of the sea. From Spalding to Boston, 12 miles, very good way in the summer, and exactly level without the least hill or rising. By the way we observed, that generally all along the ridges of their houses and the corners (which houses are covered with thatch of straw or reed, and the ridges and corners made up with clay) they plant House-leek[7] in great plenty, whether for ornament or use we did not enquire. At Kirkton [Kirton], a village near Boston, there is (which Camden also taketh notice of) a very fair Church, built Cathedral-wise. This town gives original and name to that sort of Apples which are called at Cambridge corruptly Girton Pippins, of a very pleasant taste.[8] It's truly observed by Camden, that in Holland in Lincolnshire, and generally in all the Fen countries, the Churches are very fair, and built of stone, though the country thereabouts, for many miles, scarce affords a pebble.

July the 27th, and the 28th being Sunday, we lodged at Boston. The town for that country is large, populous, and hath a good trade. The Church is fair and great. The steeple, for a tower, the tallest that ever I saw; standing in a

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[7] *Sempervivum tectorum.*

[8] Fuller (*Worthies*, 1662): "Pippins [thrive] in *Holland*, and about *Kirton* therein, whence they have acquired addition of *Kirton Pippins*, a wholsome and delicious Apple." Ray (*Hist. Plant.*, 1688): "Pippinum Kirtonianum. Parvum est depressum, & in latitudinem diffusum, umbilico lato, dulci & pungenti acore inprimis commendabile." Forsyth (*Treat. Fruit-Trees*, 1803): "A middle-sized Apple of a greenish-yellow colour, with little dark spots. The coat is generally rough towards the footstalk. . . A good apple for the table." Austen (*Treat. Fruit-Trees*, 1657), Evelyn (*Kal. Hort.*, 1664), Switzer (*Pract. Fruit-Gardener*, 1724), etc., also mentioned this apple; and Langley (*Pomona*, 1729) figured it. Abercrombie (*Brit. Fruit-Gardener*, 1779) retained its name among principal readily obtainable kinds—the Hort. Society's garden (*Cat. Fruits*, 1826) contained it—but in orchards of to-day it is not found. At Kirton itself ("famous for apples," Stukeley, 1724) there are now no memories of it.

level country, it may be seen for many miles, and is also a sea-mark. From the ground to the highest top, the ascent is of 364 steps. The lead-lanthorn (as they call it) is uncovered, and raised above the leads to a very considerable height, *viz.* 79 steps. There is a kind of Exchange which they call the Mart-yard (by Camden called the Gild) and a Free-School, and some other buildings which we took notice of. The town is governed by a Mayor, 12 Aldermen, &c.

July the 29th, we rode from Boston through Lincoln, to a place called the Spittle [Spital in the Street], 34 miles. By the way we passed Tatershall, where there is a Castle belonging to the Earl of Lincoln. This, of a market-town, is the meanest that I have seen in the South of England. In Tatershall Park we first discovered *Pneumonanthe*,[9] which afterwards, on many heathy grounds, we found both in Lincolnshire and Yorkshire. We passed very bad ways, and had like to have been laid fast in a place, called my Lady's Hole, in a rotten marshy ground near Tupham-Abbey [Tupholme Abbey].[10] As we proceeded towards Lincoln, we saw, on the left hand, the ruins of Bardney-Abbey; and on the right of Berlins [Barlings] we passed over a great Water, at a place called the short ferry.[11] At Lincoln we viewed the Cathedral, which is, indeed, a very beautiful building, with a double cross. We ascended one of the steeples, of which the Church hath three; one whereof hath in it five bells, the second six, the third only Tom. The choristers in this Church had no surplices, but only gowns with capes faced with lamb-skin. We saw the great bell just mentioned, called great Tom of Lincoln, cast in the year 1610. Here we found it true *minuunt praæsentia famam.* From this steeple we had a prospect of the City, which now

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[9] *Gentiana Pneumonanthe.*

[10] Lady's Hole Bridge (6-in. Ord.-sheet, 1907) crosses the Bucknall Beck SE. of the Abbey. There is also (T. Crowder, S. C. Wood *in lit.*) "Lady's Hole field" close by.

[11] More probably "As we proceeded towards Lincoln we saw, on the left hand the ruins of Bardney-Abbey, and on the right [those] of Berlins. We passed over a great Water," etc.

consists only of one long street. It is a mean and poor place; not well built; of little trade; many of the Churches fallen down; of no strength. In this City we saw a bowling-green, in the bottom of a pit or pond, which one would suspect should, in the winter-time, be filled with rain, and turned into a standing pool of water. The town being full of tumult, by reason that the Assizes were there that day, we staid not all night, but rode on 10 miles further to the Spittle; where we found but bad accommodations, because the Inn there had a little before been accidentally burnt down.

July the 30th, we went on from the Spittle to Glandford-Bridge [Brigg],[12] 10 miles, and thence to Barton upon Humber, 8 miles, from whence we ferried over, ourselves and our horses to Kingston upon Hull, 5 miles.

At Hull they were received by soldiers, conducted to the main-guard, etc. They "observed in a close near the town [Hull] called Granswick, great store of *Carum*;[13] it grows in many places about this town, and in some places of the Fens in Lincolnshire." On August 1st they left Hull; by the 17th they were in Scotland; and by the 30th (when the itinerary closes) they had returned to the Yorkshire border. About a week later they were back at Cambridge, whence Ray reported to Willughby,[14] some of the results of the journey.

On Saturday night last, the 7th instant, Mr. Skippon and my self arrived at Cambridge from a long Northern expedition; wherein for the most part we followed your footsteps, proceeding just so far as Sterling [Stirling], and returning by Glasgow. . . In all this journey I met with but four plants which I had not formerly observed, and in Scotland not one.

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[12] On August 2 at Pontefract Ray remarks on the Liquorice plantations, "and the best in England." But Brigg also (Evelyn's *Memoirs*) was famous for them at this time.

[13] *Carum Carvi.* Caraway.

[14] Derham's *Philosophical Letters*, 1718. Letter headed "Mr. Ray to Mr. Willisel," but corrected to Willughby later.

Those are *Pneumonanthe*, which hath a beautiful blew flower, and is perpetual: it grows plentifully in many heathy and moist grounds in Lincolnshire, and the Eastern side of Yorkshire, and flowers about the latter end of August. . . There hath been, and still continues to be here, an epidemical sickness. . . In the North of England, and in Scotland, we heard of no such thing. *Coll. Trin. Sept.* 14. 1661.

The finding of *Gentiana Pneumonanthe* was thus one of the outstanding events. The first record of it for Lincolnshire (and as a British plant) was by Johnson (*Gararde*, 1633): "This plant I neuer found but once, and that was on a wet Moorish ground, 2. or 3. miles this side Caster [Caistor], and as I remember, the place is called Netleton Moore." Ray next recorded it (*Cat. Plant. Ang.*, 1670): "In agro Lincolniensi & Eboracensi in ericetis humidioribus passim: *particularly in Tatters-hall-Park;*" and later (Gibson's *Camden*, 1695): "In a Park at Tattershall, and on the heathy grounds thereabouts: also on a heath a little beyond Wrauby [Wrawby] in the way to Hull," where he had found it (presumably) while going from Brigg to Barton, on July 30th. The mentions of the other plants, *Sempervivum tectorum* and *Carum Carvi*, both (according to Lee's *Outline Flora* and Peacock's *Check-list*) afforded first evidences for Lincolnshire, though doubtless the inhabitants had known them from old time.

ADDITIONS TO THE LIST OF FOSSIL MICRO-FAUNA OF THE WHITE-CHALK OF LINCOLNSHIRE.

C. S. Carter.

When we consider that about 220 species of Foraminifera have been recorded for the White-Chalk (middle and upper chalk) of Britain, it is surprising that not more than 29 species have been recorded for those zones in Lincolnshire.

Those 29 species were incorporated in my general list of White-Chalk Fossils of Lincolnshire, published in the 'Transactions', 1928. Seven of them do not appear in the General List of Fossils in the Geological Survey Memoir, 'The Cretaceous Rocks of Britain', Vol. III., 1904.

Mr. Sydney H. Robinson, F.R.M.S., has recently obtained, from Flint-meal supplied to him by Mr. Arthur Smith, F.L.S., from the *Holaster planus* zone at Boswell near Louth, very interesting additions to the list of Fossil Micro-Fauna of Lincolnshire White-Chalk. I understand the list and specimens have been submitted to, and confirmed by Dr. C. Davies Sherborn, Hon. F.Z.S., at the British Museum.

For the possible convenience of other workers I have collated the nomenclature of Mr. Robinson's list with that in Dr. Sherborn's monumental work, 'An Index to the Genera and Species of the Foraminifera', and have accordingly slightly amended it, as follows:—

Foraminifera.

Alveolina (Nautili) melo (= *Melionia sphaerica, M. sphaeroides*).
Globigerina ? aequilateralis.
Lagena ? sp. not well preserved.
Miliolina (Quinquiloculina) ? pulchella.
M. ? sp. immature.
Nodosaria (*Dentalina*) *adolphina.*
N. soluta.
N. radicula.

Textularia folium.
T. ? agglutinans.
Truncatulina reticula.
T. ? lobatula.
T. (Rotalia) praecincta.
Verneuilina spinulosa.
Virgulina schreibersiana.

Ostracoda.

Cythereis ornatissima Reuss.
Cytheropteron alatum Borquet.

Sponge Spicules.

Dichotrivemes of *Stellata* sp.
Corallistes sp.

Lagena sp., may possibly be the *L. marginata* of the former list. *Nodosaria adolphina* may be the *Dentalina* sp. of the former list. *Textularia folium* and *T. agglutinans* may be the two *Textularia* spp. of the former list.

All the other eleven species are apparently new records for the White-Chalk of the County.

By consulting the general list of Fossils in the Geological Survey Memoir already referred to, it may be noted that *Alveolina melo*, *Miliolina pulchella*, *Nodosaria adolphina*, *Textularia folium*, *Truncatulina reticula*, and *T. praecincta* are not recorded. *Lagena* sp.? is not recorded for any of the zones between *Holaster subglobosus* zone (Lower or Grey Chalk) and *Actinocamax quadratus* zone. *Nodosaria soluta* is not recorded for any zone above *Ammonites varians* zone (Lower Chalk). *Nodosaria radicula* and *Virgulina schreibersiana* are not recorded for any zone below that of *A. quadratus*. *Verneuilina spinulosa* is not recorded for any zone below that of *Micraster cor-testudinarium*.

The two Ostracods found by Mr. Robinson are apparently new records for the County. *Cytheropteron alatum* is only recorded in the Geological Survey Memoir for the zone *A. varians* (Lower Chalk) of Cambridge.

It is hoped that Mr. Robinson's success in this matter will be a stimulus to other Microscopists in the County to examine chalk washings and flint meal.

Report of the Hon. Secretary,

1930.

Five Field Meetings were held during the year.

The One-Hundred-and-Forty-third Meeting was held at Muckton Wood on May 22nd. A good number of members assembled at Louth; whence they proceeded via Little Cawthorpe; made a halt at "Watery Lane'; and visited one of the Chalk-pits. Muckton Wood was interesting for its Heronry and the large patches of Herb-Paris. The Butterfly Orchis, Yellow Pimpernel and Great Woodrush were seen among a wealth of less rare plants. Two false-scorpions (*Obisium muscorum*, females in nests) were observed by Mr. Kew. The Nightingale was heard. In the village some fine trees of Bird-Cherry were in full bloom.

The One-Hundred-and-Forty-fourth meeting was held in the Sleaford District on June 19th. The Rev. Canon A. Hunt, M.A., met the party and conducted them to various points, visiting Ewerby, Howell, Car Dyke, returning along the banks of the Slea. The Black Spleenwort was growing on the walls of Howell Church. Two species of *Chara* were found in the Car Dyke by Miss Noel. *Alisma ranunculoides* occurred in a pond near the Slea. Canon Hunt pointed out several objects of historic interest, and also a large erratic boulder at Ewerby Thorpe. Mrs. Hunt entertained the members to tea at the Kirkby-la-Thorpe Vicarage.

The One-Hundred-and-Forty-fifth meeting was held at Holton-le-Moor on July 24th. The chief interest of this meeting was the visit to the mine in the Claxby Ironstone (by permission of the Mid-Lincolnshire Ironstone Company). A number of the fossils obtained having been sent to Jermyn Street (for identification), we were informed that two species of *Waldheimia*, and a *Terebratula*, were probably undescribed forms. It is hoped to acquire more material for examination. The rest of the day was spent in and around the old Clay-pit where several interesting plants occur. Mrs. T. G. Dixon entertained the members to tea.

The One-Hundred-and-Forty-sixth meeting was held at Newton-on-Trent on August 28th. The visit to this interesting area was made on the hottest day of the year. Mr. Preston described the geological interest of the Newton Cliffs: the Keuper escarpment by the side of the Trent. The Milk Vetch was found, but was not nearly so plentiful as formerly. The best observation of the day was that of the Vice-President, Mr. Roebuck, who saw two specimens of the rare passing migrant the Blue-headed Yellow Wagtail.

The One-Hundred-and-Forty-seventh meeting was held at Stamford on September 25th. The Quarries on the Little Casterton Road, showing the typical structure of the Oolitic Limestone, were of great interest. In the old workings over a hundred species of plants were noted.

At all the meetings material was collected for detailed record (after examination) in the Union's registers.

The thanks of the members are due to those who have given them permission to enter their grounds, to those who have entertained them, assisted in the local arrangements, and acted as conductors, and to the owners of cars who have given transport to fellow members.

I regret to record the death of Mr. T. W. G. Hewitt, of Weelsby Old Hall, Grimsby. Though a member for many years, he seldom attended the meetings, but, by his generous support to this and other Societies in the County, he expressed his interest in their work.

I am pleased to report the addition of twenty-four new members since the last Annual Meeting:—

Mr. C. P. Arnold, Lincoln (re-joined).
Mr. and Mrs. H. Barnes, Horncastle.
Mr. P. P. Gomersall, F.R.M.S., Lincoln.
Miss Annie E. Haywood, Binbrook.
Mrs. J. Heyworth, B.Sc., Grimsby.
Mr. O. Overbeck, F.R.S.A., F.G.S., etc., Salcombe.
Mrs. W. M. Parkinson, East Ravendale.
Mrs. H. L. Parr, Saltfleet.
Miss S. G. Platt, Lincoln.
Mr. T. R. W. Powell, Lincoln.

Mr. J. F. Redhead, Lincoln.
Mr. S. H. Robinson, F.R.M.S., Lincoln.
Miss K. G. Waldram, Grimsby.
Mr. Stafford Walter, Horncastle (re-joined).
Mrs. T. W. T. Wilmot, Louth.
Mr. L. Wood, Grimsby.
Mr. W. H. Worthington, Lincoln.

and six others whose names appeared in the last part of the "Transactions".

I beg to thank members for suggesting names and addresses that have led to this accession to our membership, and appeal for continued assistance in this direction so that funds will be available for the publication of more articles in the "Transactions".

Regarding the "Transactions," 1929, my thanks are due to Mr. H. Wallis Kew (who greatly assisted me in several ways); also to Mr. C. S. Carter, and to the printers, for their co-operation.

The Financial Statement will be found on page 136. The satisfactory condition of the finances of the Union is largely due to the great help members have given by the prompt payment of their subscriptions, which has materially lightened my first year's work as Hon. Treasurer. The accounts have been audited by Mr. Frank Fletcher, of the City Treasurer's Department, Lincoln, to whom our thanks are due.

The Annual Meeting was held at Lincoln on December 4th, when Mr. E. J. Stream, M.A., F.L.S., F.R.M.S., read his Presidential Address entitled "Lincolnshire Freshwater Algae". Mr. Stream was re-elected President for 1931. The Hon. Secretary and Treasurer, Assistant Secretary, and Sectional Officers were re-elected.

As the next part of the "Transactions" commences a new volume, a list of members will be included. It is desirable that any change of address be notified to the Hon. Secretary.

Sectional Officers' Reports.

BOTANY.

Miss S. Catherine Stow.

Miss Marsden reports *Œnanthe pimpinelloides* for Withcall, Div. 8.

Billberry, *Vaccinium myrtillis*, was taken on Linwood Warren, Div. 7, by Miss J. Gibbons. This very rare plant in Lincolnshire was first found in the County by Canon Claye in 1917, at Appleby, Div. 2.

Peppermint, *Mentha piperita*, is recorded by Mr. Hurst from Boston District.

Ceterach officinarum, abundant on a wall at Tallington, near Stamford, Div. 16 (S. C. S.)

Orchis prætermissa, verified by Dr. Tahourdin from Stroxton Bog, Div. 15 (S. C. S.).

Viola ruralis, one of the arvensis type of Field Pansy, verified by E. Drabble, Spitalgate, Grantham, Div. 15 (S.C.S.)

Viola agrestris, verified by E. Drabble from Tallington, Div. 16., Ancaster Div. 15, and Stamford Div. 16 (S.C.S.).

Quite a large patch Bird's-eye Speedwell, *Veronica chamædrys*, with pale lilac flowers, Railway bank, Saltersford, Grantham, Div. 15 (S. C. S.).

Osmunda regalis near Gainsborough was reported by Dr. H. B. Willoughby Smith, and the same fern was found at Friskney by Mrs. Cheal.

Mr. C. S. Carter records *Orchis incarnata* and *Ophrys apifera* at Withcall. *Phalaris canariensis* at Swaby. *Lychnis Githago* abundant between Manby and Little Carlton.

Mr. F. T. Baker reports *Verbascum nigrum* new to Div. 6.

GEOLOGY.

H. Preston, F.G.S.

A Miniature Cavern in Limestone Rocks.

Perhaps my most interesting geological experience during the past year has been the discovery, digging-out, and preserv-

ing as a Museum specimen, of a miniature cavern in the Limestone rocks near Grantham. We were removing a hill on the East side of the Witham and found that a creep of the limestone in early Ages had entrapped an extensive bed of Glacial Clay which had failed to get denuded when the storms of an improving climate had re-excavated the Witham valley. The Boulder clay, which was filled with great blocks of limestone rubble and many large Flint boulders, was about ten feet thick; and in the much disturbed rocks immediately overlying and mixing with this clay, were many cavernous recesses. The limestone above measured from 25 to 30 feet in thickness, all of which showed signs of having crept westwards into the valley. Many of the cavernous recesses had received percolating water charged with calcite dissolved from the limestone above. In the recesses some of the water had evaporated and left its calcite behind in the form of stalactitic pillars, stalagmitic mounds, and a stalagmitic floor; and a coating of calcite had formed on the walls of the cavern; in fact every feature of the large caverns of our limestone districts was repeated here in our miniature example. The particular specimen I had dug out lies well within the compass of a cubic foot, and it is faultless in structure as in any of the larger specimens of our land. At the annual meeting I showed a photograph, somewhat enlarged, of the cavern, the original being now in the Grantham Museum.

Mr. Carter reports a cast of *Conulopsis abbreviatus* from glacial gravel at Tathwell Sandpit, and another from the bottom of a well at Cockerington.

CONCHOLOGY.

J. F. Musham.

At our Field-Meetings interest in this section has again been maintained, and notable additions have been made to the records of the "Divisions" visited. Conspicuous amongst

them is *Hygromia hispida* var. *sericea* Drap. from Nettleton Hill Top: a form of this common shell not previously recorded for Div. 3, S.W. Amongst the Pisids, *P. casertanum*, *subtruncatum*, and *milium* were taken out of a fishing-pond by the road-side above Holton-le-Moor Station, together with *Sphaerium lacustre*; these are first records for the above Division. Our thanks are due to Miss Joan Gibbons for her forethought in directing us to this particular pond, as well as to Mr. Havelock, Junr., for his help.

Mr. C. S. Carter reports for Div. 12, *Arion ater* var. *plumbea*, brought in by Mrs. Jos. Mawer: a colour-variety of this common slug not previously noticed in that Division; also a specimen of *Limax flavus* var. *rufescens* Moq., at Louth, a variety which has hitherto eluded notice in the entire County.

At our Stamford Meeting in September we were able to confirm the late Mr. W. D. Roebuck's assertion that the Brick-Yard Pond is a "one shell pond"; *Limnæa stagnalis* again occurring, but not so large as those noted in 1910, on our previous visit.

ENTOMOLOGY.

A. E. Musgrave.

There is nothing of unusual interest to report on the occurrence of butterflies in the County. *C. palaemon*, the Chequered Skipper, made a normal appearance at Skellingthorpe, as did *L. corydon*, the Chalk Hill Blue, at Ancaster. *L. astrarche*, the Brown Argus, was rather more common than usual. Practically all the records I have received relate to the appearance of three species of moths. On visiting Ropsley near Grantham in early September I was surprised to find the Red Underwing *(C. nupta)* quite common. A few weeks later Miss Stow reported the same species as occurring fairly commonly at Tallington near Stamford. It is hoped that this beautiful species is becoming well established in these parts of the County. A specimen of the Convolulus Hawk Moth was brought into the Grantham Museum in early September.

Miss Stow also reports this species from Boston. One was brought into the Lincoln Museum; and another was taken at Bardney on Sept. 9th by Mr. F. T. Baker. Mr. Fred Kime, Boston, also reports two further occurrences of this grand insect, one taken on a smack in Boston Deeps on Sept. 16th, and another caught on the outskirts of the town on Oct. 2nd. The Death's Head Hawk Moth was also reported from Boston by Mr. Hurst; and on Sept. 8th one larva, and Sept. 17th two larvae were brought into the Lincoln Museum. All three were full grown, and on the latter date a good specimen of the moth was also brought in. Mr. C. S. Carter reports the occurrence of the Death's Head Moth at Alvingham; the Convolvulus Hawk Moth fairly common at Mablethorpe; and that the Five-Spot Burnet Moth was commoner than usual in the Louth district.

Saperda carcharias, one of the less common Timber-boring Longicorn beetles, was sent to the Lincoln Museum from Skegness on August 17th by Mr. D. C. de Mond.

ORNITHOLOGY.

Notes on the Migration of Birds in North Lincolnshire during the Autumn and Winter of 1930-1.

G. H. Caton Haigh, F.Z.S., M.B.O.U.

Although some interesting movements took place, the Autumn of 1930 was not particularly favourable for the observation of migration. This was in a great measure owing to the prevalence during the latter part of October and November of winds from between N. and W. The whole month of September on the other hand was characterized by the prevalence of E. and S.E. winds and showery and unsettled weather, which, however, was by no means unfavourable to the appearance of the smaller passerine birds which form the bulk of the migrants on this coast. The dates of the principal movements were Sept. 3rd to 5th, Sept. 11th to 17th—the most important

movement of the season—Sept. 30th to Oct. 4th and Nov. 7th to 11th. No species appeared in unusual abundance except Peewits, Pink-footed Geese, and Swans.

On Sept. 1st a single Wigeon and a Shoveller were shot and a Green Sandpiper seen but there were no small migrants in the vicinity of the coast. On 2nd a few Wheatears appeared. On 3rd a couple of Pied Flycatchers, several Whitethroats, Turtle Doves and a flock of Teal. On 4th a single Redstart appeared with a few Whitethroats, and a flock of Knots was seen near Grainthorpe Haven. On 5th a couple of Pied Flycatchers and a single Redstart, two small flocks of Peewits travelling to N.W. at a great height, also a Ruff and a Common Sandpiper. On 6th a Dusky Redshank was shot on Tetney Fitties, and an Avocet was seen by several people, and is said to have remained for some days. On 8th a single Pied Flycatcher and on 9th three Ruffs. On 10th the gamekeeper saw five Geese going N.W. over his house at Grainsby. On 11th commenced the most important movement of the year. All along the coast the hedges and other covert contained dozens of Pied Flycatchers, Redstarts, Willow Wrens and Wheatears; and I also saw two Goldcrests, a Grey Wagtail, and a Green Sandpiper, also two flocks of Peewits going N.W. On 12th the passage was about the same; Pied Flycatchers, Redstarts, Willow Wrens, and Wheatears being still very abundant, and in addition I saw two or three Garden Warblers, a Lesser Whitethroat, a Goldcrest, and a young Cuckoo, also a Green Sandpiper. On 13th the same species and in about the same numbers, but I did not see Goldcrests. I saw five Kingfishers, a large flock of Knots, and a flock of Golden Plovers. On 15th five Geese were seen at North Coates. On 16th the flight of small birds was much reduced with the exception of the Redstarts which were still fairly numerous. A few Peewits were going N.W. and I saw a flock of twenty Shelducks. Most of the last named were young birds and probably bred locally. On 17th only a few small birds remained; but I saw a Blackcap, a Lesser Whitethroat; also a Pomatorhine Skua. On 18th the only small

birds were about half a dozen Redstarts, but a flock of thirty Wigeon appeared. On 20th I observed off Donna Nook a flock of twenty-one Shelducks almost all young birds, also a few Arctic Terns and two Curlew Sandpipers. On 22nd a few Redstarts in the hedges and a single Pied Flycatcher. A dead and much decayed Buzzard was washed up on the sands together with an adult Gannet. On 23rd many flocks of Peewits were travelling N.W. over Tetney, and one of the Plover decoy-men told me it was the heaviest flight he had ever seen in September. Most of the flocks were travelling along the coast, i.e. up the Humber. On 25th I saw a party of five Snipe come in from the sea and alight on Tetney Fitties. I shot one of them and found it in very poor condition. On 29th large flocks of Peewits were going N.W., both over the marsh district, and inland along the Wolds. From this date the passage of this species continued almost daily throughout the whole of October and November, unusually great flights taking place on the 21st and 29th of the latter month. On Sept. 30th a large flock of Geese went S.E. over Grainsby, and from this date till the middle of October flocks were seen almost every day mostly travelling S. or S.E. By Oct. 16th the Pink-footed Geese had assembled in their usual numbers in their accustomed winter haunts, and on 17th I saw at least 2000 Geese on two fields on the North Wolds, where they were feeding on barley which owing to the wet harvest was scattered in unusual quatities on the stubbles. Also on Sept. 30th Goldcrests and Robins were numerous in the hedges, and a few Wheatears appeared. Peewits and Starlings were travelling to N.W., and I saw a Peregrine.

On Oct. 1st Larks, Starlings and Peewits were passing to N.W., and Robins and Goldcrests still frequented the hedges near the coast. On 4th again Robins and Goldcrests, and a few Grey Crows. On 6th, only a single Goldcrest and no Robins, the weather being very stormy and unfavourable to migration. On 10th many Snipe were scattered about on wet places in stubble fields at Tetney and Waith. On 11th many Snipe again present, and a large flock of Golden Plovers

going N.W. On 14th I saw the first Woodcock in a turnip field at Saxby. On 15th I shot a Yellow-browed Warbler at North Cotes, and saw many Chaffinches and a few Great Tits. On 16th Redwings and Blackbirds numerous near the coast, and Peewits and Starlings going N.W. On 17th I noted large flocks of Golden Plover on the Wolds at Wootton and Elsham. On 18th Peewits and Starlings again passing. On 22nd a Ruff on North Cotes Fitties also the first Rock Pipit. On 23rd many Snipe and Jack Snipe arrived; Peewits, Larks, and Starlings were going N.W.; a couple of Goldcrests were in a hedge near the coast; and apparently there had been an immigration of Jays as they were unusually abundant at Grainsby and I noticed a number on hedge-row trees on Waith Fen. On 26th Redwings abundant in Grainsby Park and flocks going over to W. all day. On 27th Larks and Starlings going N.W., and many Blackbirds in the seaside hedges. On 28th one or two Woodcocks under the coast hedges.

On Nov. 3rd a few migrating Wood-pigeons appeared. On 5th I noticed flocks going W. over the Wolds at an immense height. From 9th to 13th there was a great immigration of these birds. On 22nd I saw a flock of 2000 or 3000 Pigeons going E. over Thoresby Fen; and at this time they were excessively abundant all over this district, but almost immediately began to decrease until by December 7th very few were left. On Dec. 10th and following days a fresh arrival took place and they remained abundant until all the immigrants left in March. On Nov. 3rd with a strong N.W. wind a considerable number of Ducks passed up the coast. Mallard, Wigeon, and a few Teal, also some large flights of Knots appeared on the sands. Blackbirds and Redwings were fairly numerous in the vicinity of the coast, and the first Fieldfares appeared. On 7th Rooks and Grey Crows were coming in, and Chaffinches and Greenfinches were abundant. A flock of twenty-one Swans was seen and also a single bird. On 8th Rooks still coming in. Greenfinches and Twites numerous, and one Short-eared Owl on the sea-bank. On 10th a flock of

a dozen Jays on Waith Fen, probably migrants. On 16th a few Fieldfares going W. over Grainsby. On 17th I shot a Woodcock from a heap of rubbish on the sea-bank; and saw the first Snow Buntings, many Rock Pipits, a few Common Wrens and a small flock of Long-tailed Tits. On 18th a flock of twenty White-fronted Geese was seen at North Cotes. On 20th Snow Buntings, Blackbirds, and Woodcocks, also a good many Wigeon and some Mallards. I saw a Merlin on 21st and again on 22nd probably the same bird.

On Dec. 1st an immense flock of Knots appeared on North Cotes sands. On 6th a flock of twenty Swans passed over Grainsby to N.W., and a Swan was shot by a shore shooter on the sea-bank at North Cotes out of a flock of five during a thick fog. On 8th four White-fronted Geese were feeding on a barley stubble at North Cotes. On 9th I saw the first Brambling. On 10th a punt-gunner killed thirteen Shelducks at a shot out of a flock of about 150 at Tetney Haven, and a Bittern was seen in a reed-bed near Thoresby Brigg. On 12th a Swan was seen flying over Fenby Wood and another at North Cotes; and one of the punt-gunners told me that he had seen or heard of many flocks of Swans since the beginning of this month. On 13th I saw a Razorbill in a small pool of water in a field at North Cotes. On 18th several Bramblings among a large flock of Chaffinches at Ravendale.

On Jan. 3rd 1931 a Short-eared Owl was found on a drain side at North Cotes and another on the sea-bank on 10th; and on same day a Woodcock was found near the coast. On Jan. 22nd I saw a Willow Tit at Saxby in a Larch plantation on the Wolds. It allowed me to approach within a few feet so I had no difficulty in identifying it.

As will be seen from the above notes the amount of movement of birds was above the average for September although there was no great "rush," and the weather throughout the month was on the whole favourable. The migration in October was distinctly below the average and the weather conditions were unfavourable except during the first four days.

November closely resembled the preceding month, the weather being unfavourable throughout and the migration consequently below the average. In December there was scarcely any migration at all. Many of our common winter visitors were less numerous than usual, such as Fieldfares, Redwings, Bramblings, Twites, and Grey Crows; and it was a poor Woodcock season in most places. All the Diving Ducks were very scarce probably owing to the mildness of the weather. Wild Swans on the contrary were unusually numerous but it was generally impossible to say to which species the various flocks belonged. Birds of prey of all sorts were exceptionally scarce, even the Peregrine being rarely seen. Among the rarer visitors the most interesting was the Avocet seen at Tetney Haven early in September. The Yellow-browed Warbler and Bittern are also worthy of notice though both have occurred frequently in the county and the former is probably a regular passage migrant along the coast in small numbers.

As stated in previous reports the establishment of an aerodrome and bombing school at North Cotes has spoiled the district from an Ornithologist's point of view and the N.E. coast of Lincolnshire will never again be the happy hunting ground for naturalists that it has been in the past.

BIRD NOTES FROM THE GRIMSBY DISTRICT, 1930.

S. A. Cox.

Winter Visitors.

The first three months of the year were on the whole unusually mild and open, and so far as I am aware no unusual wild-fowl appeared on the Brocklesby lakes. I saw a solitary drake Pochard and an immature Tufted Duck on Newsham Lake on January 5th, and a flock of eleven Crossbills, three of them adult males, in a sycamore by the lakeside. On February 16th I saw a drake Tufted Duck, a drake Wigeon, and a Heron at Lambert Hill. On the latter stretch of water Mr.

R. May saw a pair of Shovelers on March 9th, and on March 16th, at Newsham Lake, eight Pochard, five of them being drakes.

On February 4th I saw four Cormorants in the river Humber, while on March 2nd, during the course of a visit to Freshney Bog, I saw a Woodcock, eight Common Snipe, a Reed Bunting, three Goldfinches and a pair of Kingfishers. During the course of a ramble in the Limber district on March 23rd Crossbills were seen on several occasions, but always either solitary or in pairs, which rather suggested to me the possibility of their breeding.

Snow Buntings were exceedingly plentiful throughout the winter, and a few stragglers remained until March 22nd. Hooded Crows were last seen on March 24th, Redwings on March 30th, Bramblings on April 22nd, and Fieldfares on April 24th.

Spring Migration.

The first migrant to appear was the Wheatear, which Mr. May recorded from Limber on March 28th. The Chiff-Chaff appeared on April 1st, and the Willow Warbler on April 2nd.

I saw a solitary Yellow Wagtail on the Humber embankment on April 10th, and for the next six weeks these birds were particularly plentiful in the coastal districts.

Cold northerly winds and wintry squalls persisted during the following week, putting a temporary check on spring migration. Mr. May heard the Blackcap at Limber on April 20th. On April 24th he reported the first Swallow and Sand Martin from Limber, a solitary Common Tern at Newsham Lake and a Green Sandpiper at Lambert Hill.

On April 25th I heard the Cuckoo at Weelsby, and Mr. May reported the Garden Warbler and Tree Pipit from the Limber district, the former being exceptionally early. On the following day I heard the Lesser Whitethroat at Weelsby, and Mr. May recorded the Common Whitethroat and Grasshopper Warbler. The local Grasshopper Warbler was a day later in appearing, and subsequently occurred in no fewer than six separate localities.

On April 27th I heard a Sedge Warbler in a thicket of osiers by the side of the Humberstone Beck, and the first House Martin was seen hawking for insects at Lambert Hill. At the latter place there were also a pair of Tufted Duck and a solitary Green Sandpiper. There were six Shelduck at Newsham Lake, and a Common Buzzard was seen sailing over the lake, mobbed by a party of Carrion Crows.

On April 30th a keeper reported a Nightingale in a nursery of young forest trees near Pelham Pillar. Investigation yielded the fact that the nursery was tenanted by two pairs of Nightingales, and later in the season both nests were located. There was also a pair of these feathered musicians in the wood adjoining Ulceby Station, but efforts to find their nest were unavailing.

On May 5th there was an unusually large influx of Sedge Warblers at Weelsby, and these birds were seen far from their usual aquatic haunts.

On May 10th I saw a Whinchat at Tetney, and a solitary Swift at Humberstone. On the same day Mr. May heard the first Turtle Dove at Limber.

The Spotted Flycatcher was as usual the last of our regular migrants to appear. I first saw it on May 18th at Freshney Bog.

I saw a Little Tern at Humberstone Ftties on June 9th, but after watching its movements for some time concluded that it was merely a late straggler on migration, with no intentions of nesting. I did not record the Reed Warbler during the period of spring migration, but during the month of June at least six pairs frequented a reed-bed at Tetney, and were doubtless nesting.

NIDIFICATION.

During the early spring several nests of the Tawny Owl were located, the first of which contained four eggs on March 24th. On March 30th I found the nest of a Long-Tailed Tit-mouse at Croxby, and Mr. May found a Long-eared Owl incubating four eggs in an old magpie's nest at the top of a twenty-five feet larch in Brompton Dales. Subsequently five

young owlets were successfully reared from this nest, which they left during the last week of May.

Towards the end of April a Hawfinch nested in a pear-tree at Little Brocklesby, but abandoned the site immediately it had been discovered. On May 11th we again saw the Hawfinches in the same locality, and after a short search again found the nest, composed of twigs and roots, in a pear-tree, sixteen feet from the ground. It contained one egg, but when we again visited the nest it had been robbed, most probably by a Jay.

On May 24th I saw a Mallard's nest, containing ten eggs, in a young plantation near Limber Double Gates, and a Sparrow Hawk's nest in an Austrian pine, containing four eggs. We also took a pair of Barn Owls by hand from a hollow oak, but the cavity contained no eggs, nor did the occupants attempt to nest there at a later date.

On May 25th I found another Sparrow-Hawk's nest in a hawthorn at Weelsby, containing two eggs. A Sparrow-Hawk had nested in this same thorn two years previously, and had successfully reared three young, in spite of the fact that the nest was within twenty yards of a main thoroughfare. On the same day I saw another Mallard's nest, this time containing nine eggs, at Freshney Bog.

After several hours of patient searching on June 9th Mr. May located the nest of a Nightingale at Pelham Pillar, and I went to see it four days later. It contained four young, almost fully fledged, and was built just clear of the ground beneath a young spruce fir, amongst a tangled undergrowth of nettles, rosebay, cleavers and brambles. It was composed of dead sycamore leaves, neatly lined with fine grasses. The second Nightingale's nest was located six days later, and contained four eggs. It was located much more easily than the previous nest, being built in a small box bush.

A pair of Grasshopper Warblers frequented the same nursery in which the Nightingales reared their young, but in spite of several thorough searches, we were unable to locate their nest.

On June 24th and 25th Mr. May saw young Crossbills feeding at Little Brocklesby, proving conclusively that the species bred in the Limber district during the spring of 1930.

On July 13th I found a Little Owl with fully-fledged young in a rabbit-burrow at Weelsby. The owlets were basking outside the burrow on a sunny bank when I first noticed them, and scuttled back to safety before I could intercept them.

As usual a solitary pair of Reed Warblers nested at Newsham Lake.

A Yellowhammer's nest at Limber contained three young fledglings, about a week old, on September 8th.

AUTUMN MIGRATION.

On July 26th and 27th I saw large flocks of Crossbills at Irby Dale, and on August 10th a flock of these birds passed over Weelsby.

On August 15th I saw three Whimbrel passing over Old Clee, and heard their peculiar tittering call.

My last record for the Swift was August 24th at Mablethorpe, but Mr. May saw one on the following day at Limber.

I saw a solitary Yellow Wagtail at Old Clee on September 6th, my last record for the species.

Two skeins of Geese passed over Weelsby on September 16th early in the evening, travelling E.S.E.

Mr. May saw a cock Redstart at Limber on September 22nd, and three days later the first Grey Wagtail appeared in that neighbourhood.

A Common Tern was seen at Newsham Lake on September 28th, and several of these birds frequented the Grimsby docks daily until October 10th. I saw a Little Tern at Cleethorpes on September 28th.

On October 2nd I saw over a hundred Shelduck flying up the Humber at 9-45 a.m.

On October 3rd one of the Earl of Yarborough's keepers captured by hand a large bird of prey in a field of sugar beet. We saw the bird a few days later, and it was a Common Buzzard. It was uninjured, and was subsequently given its

freedom.

Mr. May saw a flock of Bramblings near Maux Hall on October 6th, a very early record for the species.

On October 10th Mr. F. Brewster reported having seen a solitary Swift flying with House Martins on the outskirts of Grimsby, and as I know him to be a very careful and accurate observer, I am recording this very abnormal occurrence.

On October 12th I saw the last Swallows and House Martins, and the first party of Redwings.

On October 26th there were present at Lambert Hill a drake Pochard, a pair of Tufted Duck, a Jack Snipe and seven Common Snipe, while at Newsham Lake there were two immature Goldeneyes, a Kingfisher and a Grey Wagtail.

The first Snow Buntings, a flock of twelve, arrived on the Humber embankment on October 31st.

There were four immature Goldeneyes on Newsham Lake on November 2nd, and on November 4th I saw a pair of Scaup and two Smew in the Humber. On the following day the Scaup had increased their number to twelve, but both the Smew had disappeared. I also saw a solitary Common Scoter.

On November 9th Mr. May and I obtained a fine view of a Purple Sandpiper at Cleethorpes, and were able to approach within five yards of the spot where, together with a Dunlin, it was feeding. Both birds displayed the indifference to the presence of man that is characteristic of northern waders.

On November 13th I had sent to me from Thornton Abbey a Little Auk, which had been found in a chicken-pen. It seemed in fair condition, and I released it from the end of the fish dock pier, hoping that it might survive the journey back to its feeding-grounds. Unfortunately however it was seen by a party of immature Great Black-backed Gulls, which quickly disposed of it.

On November 22nd I saw at least fifty Oystercatchers at Humberstone Fitties, and on the following day there were present at Newsham Lake one immature Goldeneye, four Wigeon and five Dabchicks.

On November 29th, in company with Mr. Crooke and

Mr. Luce of the L.N.U. I visited Humberstone Fitties. Weather conditions were far from ideal, but we saw about fifty Snow Buntings, a Golden Plover and quantities of Knot and Oystercatchers.

No Fieldfares were seen in the Grimsby district until December 3rd, and then only a solitary bird. By the end of December they were still far from common, which is very unusual when one remembers the vast hordes that arrive normally from the latter part of October onwards.

On December 21st there were four Pochard at Lambert Hill, and two Tufted Duck, one Pochard and one Dabchick at Newsham Lake. On the same date Mr. May saw twelve Goldeneyes in the Humber off Goxhill Haven, several of them being adult males in full plumage.

BIRD NOTES.

Peregrine Falcon. Capt. W. A. Cragg reports a specimen shot at Nocton, January 9th, 1930.

Redwings and Fieldfares. Captain Cragg reports a large flight, about 1000, passing over Spanby Hill on April 5th, going North-East.

Kingfisher. Captain Cragg writes, " While shooting on my Spanby land a Kingfisher got up out of one of the plantations and flew past. During the 60 years I have known this neighbourhood I have never seen or heard of one anywhere near."

Shag. Mr. Frank Hind sent a specimen to the Lincoln Museum, shot at Addlethorpe February 4th, 1930. Another was reported to have been caught in a barn at Girsby on February the 5th by Mr. C. S. Carter.

Little Auk. Mr. A. Roebuck picked up one alive, but exhausted, at Wainfleet Haven November 15th, 1930.

Crossbill. Miss Grantham picked up a dead bird at West Keal October 1st, 1930, and sent it to the Lincoln Museum.

The following notes are by Mr. C. S. Carter:—

Woodcock. These were observed in considerable numbers in Louth district in the months of January and November.

Geese. Very large "Gaggles" of Geese were observed flying in a North-Westerly direction in January and October. One "Gaggle" was estimated to consist of about 300 geese.

Water-rail. A specimen of this locally rare bird was reported to have been caught at Girsby.

Nightingale. This bird, which is a rather rare visitor to the Louth district, was much in evidence being heard in Muckton Wood, in Burwell Wood, and at Fotherby.

Ruff. A specimen of this bird was reported by Mr. Gilbert Houlden as having been seen flying over the neighbourhood of Somercotes.

Swan. A local wildfowler reported counting 26 Swans flying over Somercotes on or about 12th November.

AN ADDITION TO THE LINCOLNSHIRE SPIDERS.

Oonops domesticus. This is a small spider (about 2 mm.) which on account of its small size has probably been overlooked as this is the first record of it for the county. Taken at Lincoln November 15th, 1930. *Oonops pulcher* is well known and is found out of doors among leaves of bushes and tree litter, such as old nests of birds; *O. domesticus* is much rarer and lives in sheds and houses. The two species are closely allied and the existence of the latter has only recently been recognized. Identified by Theodore H. Savory. A. S.

MARINE ZOOLOGY.

Hippolyte spinus, a small marine crustacean, was dredged up with shrimps off Boston, August 27th, 1930, and was sent to the County Museum, Lincoln, by Mr. Fred Kime. This is a first record for Lincolnshire. A. S.

Field Book of Ponds and Streams. By Ann Haven Morgan, Ph.D. G. P. Putnam's Sons, New York and London. 448 pp. 15/- net.

Another volume of the series of Putnam's Nature Field Books. An introduction to the life of fresh water. A book brim-full of interest to those who wish to observe the various forms of life in pond and stream. Profusely illustrated, it is a guide to the student, and suggestions are given as to where and how to find and collect the various forms of aquatic life, and how to care for them in aquaria. The book is well bound and not too bulky to take on expeditions. Though American the bulk of its descriptive matter is applicable to the inhabitants of British inland waters.

Biology for Schools. By E. R. Spratt, D.Sc., and A. V. Spratt, M.Sc. University Tutorial Press Ltd., London. 403 pp. 4/6.

Though essentially a text-book is of considerable interest to the naturalist The work is based on the observation of plants and animals in their homes and on careful examinations of them, their parts and functions from specimens Hundreds of diagrams and illustrations make clear many interesting phases of plant and animal structure and purpose.

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